Ephémérides des satellites de Mars, Jupiter, Saturne et Uranus pour 1991

Th. Derouazi, Ch. Ruatti, W. Thuillot, D.T. Vu

SUPPLEMENT A LA CONNAISSANCE DES TEMPS · PARIS 1990
BUREAU DES LONGITUDES

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  - La terre, les eaux, l'atmosphère (réédition, 1984)
  - Les étoiles, le système solaire (réédition, 1985)
  - La galaxie, l'univers extra-galactique (réédition, 1988)

AVERTISSEMENT

Depuis 1980, la *Connaissance des Temps* publie les éphémérides du Soleil, de la Lune, des planètes et des satellites Galiléens de Jupiter sous forme de coefficients de Tchébycheff. A partir de 1981, des éphémérides des huit premiers satellites de Saturne ont été publiées sous la même forme dans un supplément à la *Connaissance des Temps*. Ces éphémérides ayant été appréciées par les utilisateurs, nous avons décidé d'étendre ces publications à d'autres satellites naturels du Système Solaire.

Depuis 1985, nous publions dans un même recueil des éphémérides des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus. A partir de 1991, les éphémérides des satellites de Mars ont été ajoutées. Les éphémérides ne sont plus représentées à l'aide de coefficients de Tchébycheff, mais à l'aide de fonctions mixtes du paramètre « temps » comprenant des termes séculaires et des termes périodiques. Cette représentation permet de garder une bonne précision tout en diminuant notablement le nombre de valeurs numériques à publier et en autorisant une plus grande facilité d'emploi.

La liste des satellites dont nous publions les éphémérides n'est pas limitative et nous envisageons de l'étendre en fonction des données dont nous disposerons.

En dehors des éphémérides proprement dites cet ouvrage contient des données diverses sur les satellites de Jupiter, Saturne et Uranus et présente un formulaire permettant de calculer les phénomènes des satellites Galiléens de Jupiter.

FOREWORD

Since 1980, Connaissance des Temps has published ephemerides of the Sun, the Moon, the Planets and the Galilean Satellites of Jupiter as tables of Chebychev polynomials. From 1981, ephemerides of the First Eight Satellites of Saturn have been published under the same form in a supplement to the Connaissance des Temps. These ephemerides have been well received by the users; hence, we new intend to enlarge the publication to incorporate other natural satellites of the planets.

Starting from 1985, we have gathered in this booklet, the ephemerides of the Galilean Satellites of Jupiter, the First Eight Satellites of Saturn and the Five Satellites of Uranus. From 1991, we added the ephemerides of the Satellites of Mars. The representation does not use Chebychev polynomials. It appears that a mixed form of representation, involving secular and periodic terms and depending directly on time, allow sufficient accuracy and reduces the amount of numerical data to be published. Furthermore, it is very easy to use these tables.

The list of the satellites, the ephemerides of which are published, is not limited and will be extended as soon as it is possible.

Beside the tables, the present publication contains various data concerning the satellites of Jupiter, Saturn and Uranus. We will also present, a formula which permits the calculation of the phenomena of the Galilean Satellites.

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CONTENU

On trouve dans cette publication :

— des données sur les satellites Galiléens de Jupiter rassemblant les résultats d'un certain nombre de travaux théoriques ou d'observation effectués sur ces satellites, ainsi que des données (en général recommandées par l'UAI) sur l'ensemble des satellites de Mars, Jupiter, Saturne et Uranus ;
— des tables permettant de calculer les positions des satellites de Mars, des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus ;
— des tables permettant de calculer les prédictions des phénomènes des satellites Galiléens de Jupiter.

Les éphémérides des satellites donnent les coordonnées différentielles tangentielles des satellites par rapport au centre de la planète :

$$X = \Delta\alpha \cos \delta \text{ et } Y = \Delta\delta$$

où δ est la déclinaison de la planète et où $\Delta\alpha$ et $\Delta\delta$ sont les différences en ascension droite et en déclinaison entre le satellite et la planète.

Ces coordonnées sont des coordonnées moyennes rapportées à l'équateur J2000 pour tous les satellites. L'axe des Y est dirigé vers le pôle de l'équateur moyen des coordonnées (nord) et l'axe des X est orienté dans le sens des ascensions droites croissantes (est).

Les théories utilisées pour la construction des éphémérides sont les suivantes :

— satellites de Mars : la théorie de Chapront-Touzé (1990) ;
— satellites Galiléens : la théorie de Sampson (1921) améliorée par Lieske (1977) ; les constantes introduites ont été déterminées par Arlot (1982) ;
— huit premiers satellites de Saturne : les théories issues des travaux de Dourneau (1987), de Rapaport (1977), de Kozaï (1959) et de Struve (1930) ;
— satellites d'Uranus : la théorie de Laskar et Jacobson (1987).

CONTENTS

This publication contains the following :

— data on the Galilean satellites of Jupiter which sum the results of theoretical or observational studies in addition to various data (most of which are recommended by the IAU) concerning all known satellites of Mars, Jupiter, Saturn and Uranus ;
— tables which allow the computation of the positions of the satellites of Mars, the galilean satellites of Jupiter, the first eight satellites of Saturn and the five satellites of Uranus ;
— tables to calculate the phenomena of the Galilean satellites of Jupiter.

These ephemerides of the satellites give the differential tangential coordinates of the satellites with respect to the centre of mass of the planet :

$$X = \Delta\alpha \cos \delta \text{ and } Y = \Delta\delta$$

where α is the declination of the planet, $\Delta\alpha$ and $\Delta\delta$ the separations in right ascension and declination between the satellite and the planet.
These coordinates are mean coordinates equator J2000 for all the satellites. The Y-axis is set towards the pole of the equator (North) and the X-axis towards the increasing right ascensions (East).

The theories which have been used for the construction of the ephemerides are :

— satellites of Mars : theory from Chapront-Touzé (1990) ;
— Galilean satellites : Sampson's theory (1921) improved by Lieske (1977) ; the constants introduced have been determined by Arlot (1982) ;
— first eight satellites of Saturn : theories from the studies of Dourneau (1987), Rapaport (1977), Kozaï (1959) and Struve (1930) ;
— satellites of Uranus : theory from Laskar and Jacobson (1987).

REPRÉSENTATION DES COORDONNÉES

Soit T une date Julienne appartenant à l'intervalle de temps $T0$, $T0 + \Delta t$, les coordonnées des satellites pour la date T sont données par la formule :

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin (Nt + F0) + B1 \cdot t \sin (Nt + F1) + B2 \cdot t^2 \sin (Nt + F2) + C0 \sin (2Nt + P0) \quad (1)$$

REPRESENTATION OF THE COORDINATES

Let T be a Julian date belonging to the interval of time T0, T0 + Δt. The coordinates of the satellites for the date T are given by the formula :

où :

- $t = T - T0$
- $A0, A1, B0, F0, B1, F1, B2, F2, C0, P0$ sont les coefficients numériques valables pour l'intervalle de temps $T0, T0 + \Delta t$ contenant T
- N est la fréquence associée au satellite considéré. Cette fréquence est en général proche de celle du satellite lui-même, sauf dans le cas d'Hypérion pour lequel on prend une fréquence proche de celle de Titan du fait de l'existence d'un très gros terme perturbateur de fréquence plus grande que celle du satellite lui-même.

Cette représentation sous forme de fonctions mixtes (termes séculaires et sinusoïdaux) utilise le caractère quasi périodique des variations des positions des satellites naturels des planètes. On trouvera des explications détaillées sur cette représentation dans Chapront et Vu (1984).

where :

- $t = T - T0$
- *$A0, A1, B0, F0, B1, F1, B2, F2, C0, P0$ are numerical coefficients valid for the time interval $T0, T0 + \Delta t$*
- *N is the frequency associated with the chosen satellite. Generally, N is close to the natural frequency of the satellite itself. Nevertheless, in the case of Hyperion, N is close to the frequency of Titan because of the appearance of a large disturbing term which frequency is larger than the proper frequency of the satellite.*

This representation with mixed functions (secular and sinusoidal terms) of time, makes use of the quasi-periodic character of the variations of the differential coordinates of the satellites. Detailed explanations about this representation are given in Chapront and Vu (1984).

DESCRIPTION DES ÉPHÉMÉRIDES

Pour chaque satellite et pour chaque intervalle de temps, on donne :

— les dates de début et de fin de l'intervalle de validité ainsi que la date Julienne du début de l'intervalle ; cet intervalle peut varier de 4 jours à 31 jours ;

— deux jeux de coefficients $A0, A1, B0, F0, B1, F1, B2, F2, C0, P0$: l'un pour la coordonnée X, l'autre pour la coordonnée Y. Notons que pour quelques satellites (Titan, par exemple), certains coefficients ne sont pas donnés car ils sont nuls ;

— la valeur de la fréquence N associée au satellite est indiquée en haut de chaque page.

Les unités sont : la seconde de degré pour les coefficients $A0, B0, C0$, la seconde de degré par jour pour $A1, B1$, la seconde de degré par (jour)^2 pour $B2$; les phases $F0, F1, F2, P0$ sont mesurées en radian. N est en radian par jour et le paramètre « temps » t est compté en jours à partir du début de l'intervalle (époque $T0$).

DESCRIPTION OF THE EPHEMERIDES

The following is given for each satellite and for each time interval :

— the dates of the beginning and end of the interval and the Julian date of the beginning. The duration of the time interval may cover from 4 days to 31 days ;

— two sets of coefficients $A0, A1, B0, F0, B1, F1, B2, F2, C0, P0$: the first set for the X-coordinate and the second set for the Y-coordinate. Let us note that for some satellites (Titan for example) some coefficients, with zero value, are not listed ;

— the value of frequency N, associated with the satellite indicated at the top of each page.

Units of the data : $A0, B0, C0$ in arcsecond ; $A1$ and $B1$ in arcsecond per day and $B2$ in arcsecond per (day)^2, For phases $F0, F1, F2, P0$ the unit is the radian. N is expressed in radian per day and t in days from the beginning of the interval (epoch $T0$).

ECHELLES DE TEMPS

L'argument « temps » des éphémérides publiées ici est le TDB (temps dynamique barycentrique) que l'on peut confondre, à la précision des éphémérides, avec le TDT (temps dynamique terrestre), proche du TE (temps des éphémérides) et réalisé physiquement par la mesure du TAI (temps atomique international). On a :

$$TDT = TAI + 32{,}184 \text{ s}$$

TIME-SCALES

The time argument of the ephemerides is TDB (barycentric dynamical time) which can be identified with TDT (terrestrial dynamic time) close to the former definition of ET (ephemeris time) and physically made by measuring TAI (international atomic time), so that :

$$TDT = TAI + 32.184 \text{ s}$$

Les événements astronomiques étant mesurés dans l'échelle UTC (temps universel coordonné), le tableau ci-dessous donne la relation (entre le 1 janvier 1981 et le 1 juillet 1990) entre TDT et UTC (d'après la relation entre TAI et UTC publiée par le BIPM).

Astronomical events are measured in the time-scale UTC (coordinate universal time). The table below gives the correspondence (from 1981 January 1 to 1990 July 1) between TDT and UTC (using the relationship between TAI and UTC published by BIPM).

	TDT-UTC
1981 Juil. 1 - 1982 Juil. 1	52.184 s
1982 Juil. 1 - 1983 Juil. 1	53.184 s
1983 Juil. 1 - 1985 Juil. 1	54.184 s
1985 Juil. 1 - 1988 Jan. 1	55.184 s
1988 Jan. 1 - 1990 Jan. 1	56.184 s
1990 Jan. 1 -	57.184 s

Pour 1991, on ne sait pas encore quelle en sera la valeur ; on peut cependant prendre 57 secondes, l'erreur commise n'ayant que peu d'influence sur la valeur des positions calculées des satellites.

For 1991 the value of TDT-UTC is not yet known ; one may take 57 seconds : the error made will have little effect on the values of the calculated positions of the satellites.

EXEMPLE DE CALCUL D'UNE POSITION

Pour calculer les coordonnées X et Y d'un satellite pour une date T exprimée en UTC :

— on effectue une correction déduite du tableau du paragraphe précédent pour se ramener à l'échelle TDT (identifiée à TDB) ;
— on cherche parmi les tableaux représentant X et Y celui qui correspond à l'intervalle $T0$, $T0 + \Delta t$ dans lequel se trouve T ;
— on applique la formule (1) avec $t = T - T0$.

Il faut insister sur le fait que la représentation n'est valable que sur son intervalle de validité : T doit être compris entre $T0$ et $T0 + \Delta t$.

EXEMPLE : Calculer les coordonnées tangentielles de Téthys (3e satellite de Saturne) par rapport à la planète, le 5 janvier 1991 à 23 h 30 min UTC.

On effectue d'abord une correction pour se ramener à l'échelle TDB. Pour 1991 nous avons choisi 57 secondes ; la date T est donc le 5 janvier 1991 à 23 h 30 min 57 s TDB.

Les coefficients nécessaires au calcul de X et Y sont ceux de la page 67 correspondant à l'intervalle du 1er janvier à 0 h au 17 janvier à 0 h. On a, pour X :

EXAMPLE OF A POSITION CALCULATION

To compute the X and Y coordinates of a satellite for a date T (expressed in UTC), one has to :

— apply the correction deduced from the preceding table to express the date T in TDT (identified with TDB) ;
— select from the tables of coefficients, the one which corresponds to the time interval T0, T0 + Δt where T is found ;
— apply formula (1) with t = T – T0.

It is important to state that the representation is valid only for its time interval : T must belong to the interval T0, T0 + Δt.

EXAMPLE : Let us compute the tangential coordinates of Tethys (third satellite of Saturn) with respect to the planet for 1991 January 5, 23 h 30 min UTC.

First, the date must be corrected in order to fit with the TDB time-scale. For 1991, we choose 57 seconds ; so, the date T is 1991 January 5, 23 h 30 min 57 s TDB.

The coefficients necessary to compute X and Y are given on page 67 (interval from January, 1, 0 h to January 17, 0 h). We read for X :

$A0 = -0.000\,6$, $A1 = 0.$, $B0 = 37.036\,5$, $B1 = 0.072\,81$, $B2 = 0.000\,373$, $C0 = 0.003\,2$,
$F0 = 3.626\,066$, $F1 = 1.847\,1$, $F2 = 3.759\,3$, $P0 = 4.224\,9$,

et pour Y :

$A0 = -0.000\,9$, $A1 = 0$, $B0 = 14.367\,6$, $B1 = 0.031\,94$, $B2 = 0.000\,133$, $C0 = 0.001\,3$,
$F0 = 5.421\,305$, $F1 = 3.078\,3$, $F2 = 5.914\,9$, $P0 = 6.039\,4$,

On applique ensuite la formule (1) : *We then apply formula (1) :*

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

On a ici :

N = 3,328 radian/jour

t est le nombre de jours écoulés entre le 1 janvier à 0 h (début de l'intervalle) et le 5 janvier à 23 h 30 min 57 s, soit 4,979 826 jours.

On obtient finalement :

X = + 35,99"
Y = + 0,07"

PRÉCISION DES ÉPHÉMÉRIDES

Les théories dont sont issues les éphémérides sont construites pour la plupart avec une précision meilleure que 0,01" géocentrique.

Les observations utilisées pour l'ajustement des constantes et aussi certains défauts de la théorie ne permettent pas d'obtenir en réalité une précision meilleure que 0,05" ; cette précision peut n'être que de 0,5" pour Hyperion.

La représentation en fonctions mixtes publiée ici a été déterminée de façon à ce que l'écart avec la théorie-source soit de l'ordre de 0,01".

PHÉNOMÈNES DES SATELLITES GALILÉENS DE JUPITER

Les prédictions des phénomènes des satellites Galiléens sont données suivant une représentation polynômiale en fonction d'une variable temporelle. La méthode (Thuillot, 1983) permet une représentation compacte puisque 14 coefficients suffisent à représenter chaque type de phénomène (passages, occultations, éclipses, passages d'ombre, débuts ou fins) de chaque satellite pour une année entière avec une précision de l'ordre de la minute de temps.

Des explications sur cette méthode, le formulaire et les tables de coefficients sont donnés pages 51 à 54.

Where :

N = 3.328 radian/day

t is the number of days elapsed between January 1, 0 h (beginning of the interval) and January 5, 23 h 30 min 57 s. Hence t = 4.979 826 days.

Finally, we get :

X = + 35.99"
Y = + 0.07"

ACCURACY OF THE EPHEMERIDES

The theories from which are built the ephemerides have an internal precision better than 0.01" (in a geocentric reference frame).

In reality, the observations used to fit the constants and shortcomings in the theories, do not allow a precision better than 0.05" and may reach 0.5" for Hyperion.

The representation in mixed functions, as published here, has been determined in such a way that the difference between the representation and the source always remains around 0.01".

PHENOMENA OF THE GALILEAN SATELLITES OF JUPITER

The predictions of the phenomena of the Galilean Satellites are given as a polynomial representation which depends directly on time. The method (Thuillot, 1983) allows a compact representation as only 14 coefficients are sufficient to represent each type of phenomenon (transits, occultations, eclipses, shadow transits, beginnings or ends) for each satellite for a complete year with an accuracy of about one minute of time.

Some explanations about the method, the formulae and the tables of coefficients are given on pages 51 to 54.

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Note : Les calculs nécesaires à l'élaboration de cet ouvrage ont été effectués sur l'ordinateur NAS 9080 du Centre Inter-Régional de Calcul Electronique du CNRS, F-91405 ORSAY (France).

Nota : The calculations performed in order to build these tables have been made on the NAS 9080 computer of the Centre Inter-Régional de Calcul Electronique of the CNRS, F-91405 ORSAY (France).

SATELLITES DE MARS

SATELLITES OF MARS

DONNÉES SUR LES SATELLITES DE MARS

DATA ON THE SATELLITES OF MARS

NOM	masse	rayon	période rotation sidérale	albédo géométrique	magnitude visuelle	période orbitale	élongation maximale	1/2 grand axe	excentricité	inclinaison sur l'équateur de Mars
unité →	masse de Mars	km	jour			jour	(') (")	10^3 km		degré
I Phobos	2.0×10^{-8}	13 x 11 x 9	(S)	0.06	11.6	0.3189	25	9.38	0.0151	1.1
II Deimos	0.3×10^{-8}	8 x 6 x 5	(S)	0.06	12.7	1.262	1 02	23.46	0.0002	09/2.7
NAME	*mass*	*radius*	*sidereal period*	*geometrical albedo*	*visual magnitude*	*orbital period*	*greatest elongation*	*semi major axis*	*eccentricity*	*inclination on Mars' equator*
unit →	*Mars' mass*	*km*	*day*			*day*	*(') (")*	*10^3 km*		*degree*

NOTES

(S) : Révolution synchrone

(S) : synchronous revolution

ÉPHÉMÉRIDES DES SATELLITES DE MARS

EPHEMERIDES OF THE SATELLITES OF MARS

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000.

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000.

$$\Delta\alpha \cos\delta = X$$
$$\Delta\delta = Y$$

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of the beginning of the interval and T the date for the calculation

satellite	intervalle Δt (jours)	N (rad/j)	page
Phobos	7	19.702 7	16
Deimos	7	4.978 8	20
	(days)	*(rad/d)*	

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS N=19.7027

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.1573	-0.00044	+15.4576	+0.16450	+0.001786	+0.1134
(2448257.5)				0.084994	3.3487	5.1502	-0.3337
A JAN. 8 (OH)	Y:	+0.0066	-0.00191	+12.0289	+0.12495	+0.000332	+0.0885
				5.886218	2.9139	3.9404	-0.8133
JAN. 8 (OH)	X:	-0.1599	+0.00029	+14.3476	+0.16056	+0.001280	+0.1056
(2448264.5)				6.041390	3.2011	5.0454	-1.0359
A JAN.15 (OH)	Y:	-0.0064	-0.00147	+11.1650	+0.12674	+0.000252	+0.0818
				5.560164	2.6421	4.7800	-1.5108
JAN.15 (OH)	X:	-0.1575	+0.00070	+13.3167	+0.15627	+0.000976	+0.0974
(2448271.5)				5.700777	3.0077	4.9284	-1.7531
A JAN.22 (OH)	Y:	-0.0162	-0.00113	+10.3156	+0.12461	+0.000423	+0.0749
				5.228660	2.3553	5.0672	-2.2220
JAN.22 (OH)	X:	-0.1516	+0.00083	+12.3807	+0.15145	+0.000805	+0.0903
(2448278.5)				5.348038	2.7795	4.8432	-2.4928
A JAN.29 (OH)	Y:	-0.0235	-0.00088	+ 9.5024	+0.11971	+0.000572	+0.0691
				4.892509	2.0583	5.0378	-2.9422
JAN.29 (OH)	X:	-0.1442	+0.00091	+11.5449	+0.14620	+0.000696	+0.0847
(2448285.5)				4.985056	2.5258	4.8396	-3.2416
A FEV. 5 (OH)	Y:	-0.0289	-0.00062	+ 8.7366	+0.11290	+0.000631	+0.0639
				4.552658	1.7515	4.9808	-3.6582
FEV. 5 (OH)	X:	-0.1365	+0.00111	+10.8056	+0.14066	+0.000626	+0.0799
(2448292.5)				4.613625	2.2541	4.9404	-3.9892
A FEV.12 (OH)	Y:	-0.0330	-0.00031	+ 8.0217	+0.10524	+0.000619	+0.0586
				4.210049	1.4324	4.9189	-4.3715
FEV.12 (OH)	X:	-0.1288	+0.00139	+10.1556	+0.13435	+0.000558	+0.0751
(2448299.5)				4.235004	1.9673	5.1058	-4.7409
A FEV.19 (OH)	Y:	-0.0359	-0.00006	+ 7.3567	+0.09747	+0.000556	+0.0534
				3.865518	1.0962	4.7818	-5.0918
FEV.19 (OH)	X:	-0.1206	+0.00154	+ 9.5902	+0.12734	+0.000474	+0.0707
(2448306.5)				3.850312	1.6611	5.2177	-5.5064
A FEV.26 (OH)	Y:	-0.0376	+0.00004	+ 6.7397	+0.09034	+0.000490	+0.0489
				3.520111	0.7427	4.4723	-5.8190
FEV.26 (OH)	X:	-0.1119	+0.00141	+ 9.1038	+0.12067	+0.000374	+0.0674
(2448313.5)				3.461062	1.3334	5.1102	-6.2791
A MAR. 5 (OH)	Y:	-0.0383	-0.00001	+ 6.1668	+0.08408	+0.000491	+0.0450
				3.175143	0.3796	4.0483	-0.2573
MAR. 5 (OH)	X:	-0.1031	+0.00105	+ 8.6859	+0.11524	+0.000324	+0.0648
(2448320.5)				3.068865	0.9919	4.6493	-0.7657
A MAR.12 (OH)	Y:	-0.0384	-0.00015	+ 5.6324	+0.07826	+0.000552	+0.0411
				2.831817	0.0132	3.6995	-0.9718
MAR.12 (OH)	X:	-0.0950	+0.00073	+ 8.3241	+0.11067	+0.000395	+0.0623
(2448327.5)				2.674768	0.6481	4.2001	-1.5317
A MAR.19 (OH)	Y:	-0.0387	-0.00021	+ 5.1318	+0.07231	+0.000593	+0.0373
				2.491080	5.9238	3.4439	-1.6850
MAR.19 (OH)	X:	-0.0884	+0.00061	+ 8.0093	+0.10587	+0.000503	+0.0597
(2448334.5)				2.279309	0.3057	4.0249	-2.3023
A MAR.26 (OH)	Y:	-0.0393	-0.00015	+ 4.6630	+0.06625	+0.000570	+0.0337
				2.153965	5.5378	3.1990	-2.3987
MAR.26 (OH)	X:	-0.0830	+0.00066	+ 7.7369	+0.10041	+0.000564	+0.0577
(2448341.5)				1.883071	6.2396	3.9492	-3.0822
A AVR. 2 (OH)	Y:	-0.0400	-0.00002	+ 4.2258	+0.06065	+0.000502	+0.0306
				1.821973	5.1362	2.8804	-3.1082
AVR. 2 (OH)	X:	-0.0781	+0.00074	+ 7.5022	+0.09508	+0.000546	+0.0565
(2448348.5)				1.486976	5.8753	3.8058	-3.8564
A AVR. 9 (OH)	Y:	-0.0405	+0.00005	+ 3.8200	+0.05591	+0.000458	+0.0278
				1.497058	4.7262	2.4444	-3.8031

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS N=19.7027

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AVR. 9 (OH)	X:	-0.0734	+0.00074	+ 7.2977	+0.09067	+0.000482	+0.0551
(2448355.5)				1.091812	5.4992	3.4993	-4.6202
A AVR.16 (OH)	Y:	-0.0406	+0.00006	+ 3.4445	+0.05168	+0.000466	+0.0250
				1.181274	4.3146	1.9901	-4.4851
AVR.16 (OH)	X:	-0.0688	+0.00066	+ 7.1159	+0.08712	+0.000448	+0.0533
(2448362.5)				0.697955	5.1197	2.9949	-5.3873
A AVR.23 (OH)	Y:	-0.0406	+0.00000	+ 3.0996	+0.04751	+0.000485	+0.0223
				0.876702	3.8990	1.5989	-5.1604
AVR.23 (OH)	X:	-0.0645	+0.00058	+ 6.9513	+0.08384	+0.000494	+0.0519
(2448369.5)				0.305534	4.7421	2.4629	-6.1639
A AVR.30 (OH)	Y:	-0.0406	-0.00004	+ 2.7881	+0.04336	+0.000474	+0.0201
				0.585582	3.4737	1.2397	-5.8260
AVR.30 (OH)	X:	-0.0609	+0.00053	+ 6.8000	+0.08024	+0.000560	+0.0513
(2448376.5)				6.197780	4.3648	2.0826	-0.6486
A MAI 7 (OH)	Y:	-0.0408	-0.00005	+ 2.5144	+0.03952	+0.000439	+0.0183
				0.310175	3.0364	0.8500	-0.1861
MAI 7 (OH)	X:	-0.0576	+0.00045	+ 6.6593	+0.07625	+0.000559	+0.0503
(2448383.5)				5.808378	3.9823	1.8160	-1.4043
A MAI 14 (OH)	Y:	-0.0411	-0.00004	+ 2.2831	+0.03615	+0.000406	+0.0167
				0.052290	2.5902	0.3957	-0.8052
MAI 14 (OH)	X:	-0.0545	+0.00029	+ 6.5271	+0.07240	+0.000481	+0.0489
(2448390.5)				5.420655	3.5916	1.5593	-2.1657
A MAI 21 (OH)	Y:	-0.0415	-0.00002	+ 2.0992	+0.03310	+0.000392	+0.0154
				6.095464	2.1396	6.2040	-1.4134
MAI 21 (OH)	X:	-0.0518	+0.00014	+ 6.4012	+0.06925	+0.000373	+0.0479
(2448397.5)				5.034786	3.1960	1.1907	-2.9328
A MAI 28 (OH)	Y:	-0.0418	-0.00002	+ 1.9667	+0.03017	+0.000381	+0.0146
				5.870809	1.6829	5.7646	-2.0131
MAI 28 (OH)	X:	-0.0497	+0.00012	+ 6.2785	+0.06695	+0.000324	+0.0472
(2448404.5)				4.650813	2.8040	0.6167	-3.6928
A JUN. 4 (OH)	Y:	-0.0420	-0.00003	+ 1.8879	+0.02742	+0.000358	+0.0142
				5.655401	1.2157	5.3421	-2.6026
JUN. 4 (OH)	X:	-0.0483	+0.00024	+ 6.1565	+0.06485	+0.000370	+0.0464
(2448411.5)				4.268389	2.4221	0.1523	-4.4433
A JUN.11 (OH)	Y:	-0.0422	-0.00004	+ 1.8612	+0.02503	+0.000333	+0.0142
				5.440706	0.7366	4.8984	-3.1929
JUN.11 (OH)	X:	-0.0470	+0.00040	+ 6.0353	+0.06235	+0.000414	+0.0452
(2448418.5)				3.887055	2.0434	6.2102	-5.1965
A JUN.18 (OH)	Y:	-0.0424	-0.00005	+ 1.8810	+0.02300	+0.000317	+0.0145
				5.218217	0.2483	4.4422	-3.7963
JUN.18 (OH)	X:	-0.0454	+0.00044	+ 5.9162	+0.05972	+0.000390	+0.0442
(2448425.5)				3.506683	1.6569	6.0505	-5.9544
A JUN.25 (OH)	Y:	-0.0427	-0.00004	+ 1.9388	+0.02121	+0.000308	+0.0150
				4.981716	6.0348	4.0151	-4.4173
JUN.25 (OH)	X:	-0.0434	+0.00031	+ 5.7993	+0.05768	+0.000305	+0.0435
(2448432.5)				3.127397	1.2612	5.8052	-0.4274
A JUL. 2 (OH)	Y:	-0.0431	-0.00001	+ 2.0246	+0.01966	+0.000293	+0.0158
				4.728132	5.5255	3.6257	-5.0523
JUL. 2 (OH)	X:	-0.0413	+0.00012	+ 5.6825	+0.05647	+0.000228	+0.0427
(2448439.5)				2.749137	0.8680	5.3125	-1.1766
A JUL. 9 (OH)	Y:	-0.0433	+0.00000	+ 2.1290	+0.01855	+0.000273	+0.0166
				4.457102	5.0027	3.2132	-5.7021
JUL. 9 (OH)	X:	-0.0397	+0.00003	+ 5.5642	+0.05558	+0.000239	+0.0417
(2448446.5)				2.371468	0.4876	4.7211	-1.9220
A JUL.16 (OH)	Y:	-0.0435	+0.00000	+ 2.2447	+0.01797	+0.000263	+0.0174
				4.170006	4.4781	2.7368	-0.0882

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS N=19.7027

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.16 (0H) (2448453.5)	X:	-0.0386	+0.00007	+ 5.4453 1.993846	+0.05441 0.1154	+0.000292 4.4302	+0.0406 -2.6755
A JUL.23 (0H)	Y:	-0.0436	-0.00001	+ 2.3660 3.869085	+0.01770 3.9596	+0.000271 2.2557	+0.0184 -0.7714
JUL.23 (0H) (2448460.5)	X:	-0.0376	+0.00018	+ 5.3279 1.616032	+0.05308 6.0220	+0.000314 4.2849	+0.0398 -3.4324
A JUL.30 (0H)	Y:	-0.0437	-0.00002	+ 2.4886 3.556675	+0.01761 3.4428	+0.000281 1.8306	+0.0194 -1.4606
JUL.30 (0H) (2448467.5)	X:	-0.0365	+0.00026	+ 5.2124 1.237957	+0.05208 5.6377	+0.000297 4.1219	+0.0392 -4.1811
A AOU. 6 (0H)	Y:	-0.0438	-0.00003	+ 2.6089 3.234776	+0.01778 2.9243	+0.000276 1.4363	+0.0203 -2.1555
AOU. 6 (0H) (2448474.5)	X:	-0.0350	+0.00029	+ 5.0983 0.859437	+0.05172 5.2516	+0.000253 3.8197	+0.0382 -4.9254
A AOU.13 (0H)	Y:	-0.0440	-0.00002	+ 2.7245 2.904982	+0.01835 2.4112	+0.000250 1.0045	+0.0210 -2.8634
AOU.13 (0H) (2448481.5)	X:	-0.0333	+0.00029	+ 4.9849 0.480089	+0.05186 4.8717	+0.000223 3.2778	+0.0371 -5.6804
A AOU.20 (0H)	Y:	-0.0441	-0.00002	+ 2.8339 2.568537	+0.01924 1.9176	+0.000225 0.4651	+0.0218 -3.5808
AOU.20 (0H) (2448488.5)	X:	-0.0315	+0.00032	+ 4.8725 0.099394	+0.05204 4.4991	+0.000245 2.7099	+0.0364 -0.1582
A AOU.27 (0H)	Y:	-0.0443	-0.00004	+ 2.9361 2.226489	+0.02012 1.4453	+0.000227 6.1999	+0.0227 -4.2943
AOU.27 (0H) (2448495.5)	X:	-0.0296	+0.00034	+ 4.7621 6.000048	+0.05196 4.1279	+0.000283 2.3680	+0.0358 -0.9100
A SEP. 3 (0H)	Y:	-0.0444	-0.00003	+ 3.0305 1.879776	+0.02082 0.9836	+0.000242 5.7847	+0.0233 -5.0090
SEP. 3 (0H) (2448502.5)	X:	-0.0274	+0.00032	+ 4.6547 5.615325	+0.05180 3.7524	+0.000289 2.1772	+0.0349 -1.6609
A SEP.10 (0H)	Y:	-0.0447	+0.00000	+ 3.1164 1.529228	+0.02148 0.5235	+0.000240 5.4673	+0.0238 -5.7343
SEP.10 (0H) (2448509.5)	X:	-0.0250	+0.00027	+ 4.5515 5.228169	+0.05192 3.3719	+0.000256 2.0393	+0.0339 -2.4225
A SEP.17 (0H)	Y:	-0.0449	+0.00005	+ 3.1931 1.175571	+0.02232 0.0663	+0.000209 5.1235	+0.0243 -0.1823
SEP.17 (0H) (2448516.5)	X:	-0.0224	+0.00025	+ 4.4530 4.838384	+0.05263 2.9918	+0.000198 1.8152	+0.0332 -3.1909
A SEP.24 (0H)	Y:	-0.0450	+0.00006	+ 3.2599 0.819294	+0.02338 5.9062	+0.000175 4.5841	+0.0249 -0.9086
SEP.24 (0H) (2448523.5)	X:	-0.0200	+0.00034	+ 4.3591 4.445531	+0.05377 2.6206	+0.000171 1.3061	+0.0327 -3.9541
A OCT. 1 (0H)	Y:	-0.0448	+0.00000	+ 3.3161 0.460639	+0.02430 5.4809	+0.000190 3.9408	+0.0253 -1.6329
OCT. 1 (0H) (2448530.5)	X:	-0.0175	+0.00051	+ 4.2709 4.048930	+0.05488 2.2573	+0.000219 0.7969	+0.0320 -4.7168
A OCT. 8 (0H)	Y:	-0.0446	-0.00007	+ 3.3622 0.099931	+0.02483 5.0597	+0.000231 3.5019	+0.0255 -2.3644
OCT. 8 (0H) (2448537.5)	X:	-0.0145	+0.00066	+ 4.1912 3.648057	+0.05575 1.8926	+0.000289 0.5372	+0.0313 -5.4891
A OCT.15 (0H)	Y:	-0.0446	-0.00010	+ 3.3984 6.020908	+0.02510 4.6289	+0.000243 3.1735	+0.0257 -3.0998
OCT.15 (0H) (2448544.5)	X:	-0.0108	+0.00070	+ 4.1230 3.242833	+0.05667 1.5193	+0.000320 0.3831	+0.0308 -6.2712
A OCT.22 (0H)	Y:	-0.0448	-0.00002	+ 3.4238 5.657827	+0.02541 4.1878	+0.000215 2.7864	+0.0259 -3.8339

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS N=19.7027

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.16 (0H) (2448453.5)	X:	-0.0386	+0.00007	+ 5.4453 1.993846	+0.05441 0.1154	+0.000292 4.4302	+0.0406 -2.6755
A JUL.23 (0H)	Y:	-0.0436	-0.00001	+ 2.3660 3.869085	+0.01770 3.9596	+0.000271 2.2557	+0.0184 -0.7714
JUL.23 (0H) (2448460.5)	X:	-0.0376	+0.00018	+ 5.3279 1.616032	+0.05308 6.0220	+0.000314 4.2849	+0.0398 -3.4324
A JUL.30 (0H)	Y:	-0.0437	-0.00002	+ 2.4886 3.556675	+0.01761 3.4428	+0.000281 1.8306	+0.0194 -1.4606
JUL.30 (0H) (2448467.5)	X:	-0.0365	+0.00026	+ 5.2124 1.237957	+0.05208 5.6377	+0.000297 4.1219	+0.0392 -4.1811
A AOU. 6 (0H)	Y:	-0.0438	-0.00003	+ 2.6089 3.234776	+0.01778 2.9243	+0.000276 1.4363	+0.0203 -2.1555
AOU. 6 (0H) (2448474.5)	X:	-0.0350	+0.00029	+ 5.0983 0.859437	+0.05172 5.2516	+0.000253 3.8197	+0.0382 -4.9254
A AOU.13 (0H)	Y:	-0.0440	-0.00002	+ 2.7245 2.904982	+0.01835 2.4112	+0.000250 1.0045	+0.0210 -2.8634
AOU.13 (0H) (2448481.5)	X:	-0.0333	+0.00029	+ 4.9849 0.480089	+0.05186 4.8717	+0.000223 3.2778	+0.0371 -5.6804
A AOU.20 (0H)	Y:	-0.0441	-0.00002	+ 2.8339 2.568537	+0.01924 1.9176	+0.000225 0.4651	+0.0218 -3.5808
AOU.20 (0H) (2448488.5)	X:	-0.0315	+0.00032	+ 4.8725 0.099394	+0.05204 4.4991	+0.000245 2.7099	+0.0364 -0.1582
A AOU.27 (0H)	Y:	-0.0443	-0.00004	+ 2.9361 2.226489	+0.02012 1.4453	+0.000227 6.1999	+0.0227 -4.2943
AOU.27 (0H) (2448495.5)	X:	-0.0296	+0.00034	+ 4.7621 6.000048	+0.05196 4.1279	+0.000283 2.3680	+0.0358 -0.9100
A SEP. 3 (0H)	Y:	-0.0444	-0.00003	+ 3.0305 1.879776	+0.02082 0.9836	+0.000242 5.7847	+0.0233 -5.0090
SEP. 3 (0H) (2448502.5)	X:	-0.0274	+0.00032	+ 4.6547 5.615325	+0.05180 3.7524	+0.000289 2.1772	+0.0349 -1.6609
A SEP.10 (0H)	Y:	-0.0447	+0.00000	+ 3.1164 1.529228	+0.02148 0.5235	+0.000240 5.4673	+0.0238 -5.7343
SEP.10 (0H) (2448509.5)	X:	-0.0250	+0.00027	+ 4.5515 5.228169	+0.05192 3.3719	+0.000256 2.0393	+0.0339 -2.4225
A SEP.17 (0H)	Y:	-0.0449	+0.00005	+ 3.1931 1.175571	+0.02232 0.0663	+0.000209 5.1235	+0.0243 -0.1823
SEP.17 (0H) (2448516.5)	X:	-0.0224	+0.00025	+ 4.4530 4.838384	+0.05263 2.9918	+0.000198 1.8152	+0.0332 -3.1909
A SEP.24 (0H)	Y:	-0.0450	+0.00006	+ 3.2599 0.819294	+0.02338 5.9062	+0.000175 4.5841	+0.0249 -0.9086
SEP.24 (0H) (2448523.5)	X:	-0.0200	+0.00034	+ 4.3591 4.445531	+0.05377 2.6206	+0.000171 1.3061	+0.0327 -3.9541
A OCT. 1 (0H)	Y:	-0.0448	+0.00000	+ 3.3161 0.460639	+0.02430 5.4809	+0.000190 3.9408	+0.0253 -1.6329
OCT. 1 (0H) (2448530.5)	X:	-0.0175	+0.00051	+ 4.2709 4.048930	+0.05488 2.2573	+0.000219 0.7969	+0.0320 -4.7168
A OCT. 8 (0H)	Y:	-0.0446	-0.00007	+ 3.3622 0.099931	+0.02483 5.0597	+0.000231 3.5019	+0.0255 -2.3644
OCT. 8 (0H) (2448537.5)	X:	-0.0145	+0.00066	+ 4.1912 3.648057	+0.05575 1.8926	+0.000289 0.5372	+0.0313 -5.4891
A OCT.15 (0H)	Y:	-0.0446	-0.00010	+ 3.3984 6.020908	+0.02510 4.6289	+0.000243 3.1735	+0.0257 -3.0998
OCT.15 (0H) (2448544.5)	X:	-0.0108	+0.00070	+ 4.1230 3.242833	+0.05667 1.5193	+0.000320 0.3831	+0.0308 -6.2712
A OCT.22 (0H)	Y:	-0.0448	-0.00002	+ 3.4238 5.657827	+0.02541 4.1878	+0.000215 2.7864	+0.0259 -3.8339

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DU SATELLITE 1 DE MARS: PHOBOS N=19.7027

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
OCT.22 (OH) (2448551.5)	X:	-0.0065	+0.00064	+ 4.0682 2.833475	+0.05813 1.1398	+0.000297 0.1950	+0.0306 -0.7699
A OCT.29 (OH)	Y:	-0.0450	+0.00008	+ 3.4369 5.294288	+0.02583 3.7496	+0.000189 2.1707	+0.0261 -4.5628
OCT.29 (OH) (2448558.5)	X:	-0.0018	+0.00056	+ 4.0273 2.420041	+0.06019 0.7647	+0.000249 6.0819	+0.0304 -1.5461
A NOV. 5 (OH)	Y:	-0.0449	+0.00016	+ 3.4364 4.930473	+0.02602 3.3211	+0.000219 1.5066	+0.0259 -5.2915
NOV. 5 (OH) (2448565.5)	X:	+0.0027	+0.00056	+ 4.0023 2.002384	+0.06230 0.3978	+0.000258 5.4768	+0.0301 -2.3312
A NOV.12 (OH)	Y:	-0.0443	+0.00017	+ 3.4223 4.566740	+0.02568 2.8897	+0.000269 1.0672	+0.0257 -6.0258
NOV.12 (OH) (2448572.5)	X:	+0.0073	+0.00065	+ 3.9969 1.580773	+0.06401 0.0318	+0.000332 5.0250	+0.0301 -3.1299
A NOV.19 (OH)	Y:	-0.0433	+0.00014	+ 3.3943 4.203830	+0.02499 2.4392	+0.000291 0.7084	+0.0255 -0.4764
NOV.19 (OH) (2448579.5)	X:	+0.0122	+0.00078	+ 4.0145 1.156156	+0.06541 5.9422	+0.000403 4.7303	+0.0306 -3.9264
A NOV.26 (OH)	Y:	-0.0422	+0.00014	+ 3.3511 3.842619	+0.02432 1.9669	+0.000287 0.2834	+0.0253 -1.2011
NOV.26 (OH) (2448586.5)	X:	+0.0175	+0.00087	+ 4.0565 0.729863	+0.06701 5.5604	+0.000419 4.4380	+0.0311 -4.7111
A DEC. 3 (OH)	Y:	-0.0410	+0.00019	+ 3.2910 3.483912	+0.02386 1.4821	+0.000293 6.0082	+0.0247 -1.9199
DEC. 3 (OH) (2448593.5)	X:	+0.0233	+0.00093	+ 4.1226 0.303090	+0.06903 5.1759	+0.000377 4.0082	+0.0314 -5.5024
A DEC.10 (OH)	Y:	-0.0395	+0.00029	+ 3.2125 3.128455	+0.02335 0.9903	+0.000338 5.4451	+0.0239 -2.6437
DEC.10 (OH) (2448600.5)	X:	+0.0294	+0.00097	+ 4.2119 6.159952	+0.07105 4.7945	+0.000356 3.3817	+0.0322 -0.0216
A DEC.17 (OH)	Y:	-0.0375	+0.00037	+ 3.1154 2.777222	+0.02268 0.4788	+0.000392 4.9871	+0.0232 -3.3636
DEC.17 (OH) (2448607.5)	X:	+0.0358	+0.00099	+ 4.3238 5.735011	+0.07247 4.4148	+0.000411 2.7830	+0.0334 -0.8138
A DEC.24 (OH)	Y:	-0.0349	+0.00045	+ 3.0000 2.431664	+0.02217 6.2190	+0.000415 4.5664	+0.0224 -4.0687
DEC.24 (OH) (2448614.5)	X:	+0.0424	+0.00096	+ 4.4567 5.312484	+0.07307 4.0306	+0.000480 2.3690	+0.0345 -1.5928
A DEC.31 (OH)	Y:	-0.0317	+0.00054	+ 2.8670 2.093690	+0.02227 5.6545	+0.000411 4.1002	+0.0212 -4.7648
DEC.31 (OH) (2448621.5)	X:	+0.0491	+0.00086	+ 4.6078 4.893370	+0.07309 3.6367	+0.000489 2.0491	+0.0354 -2.3745
A JAN. 7 (OH)	Y:	-0.0279	+0.00063	+ 2.7177 1.765645	+0.02303 5.0912	+0.000406 3.5710	+0.0200 -5.4563

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DU SATELLITE 2 DE MARS: DEIMOS N= 4.9788

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.0006	+0.00034	+38.7891	+0.41395	+0.005021	+0.0072
(2448257.5)				3.823907	0.8429	2.5693	4.1046
A JAN. 8 (OH)	Y:	-0.0027	+0.00031	+30.2140	+0.32017	+0.001214	+0.0066
				3.316012	0.3654	1.7089	3.6046
JAN. 8 (OH)	X:	-0.0004	+0.00026	+36.0112	+0.40876	+0.002936	+0.0059
(2448264.5)				0.957009	4.4472	0.0391	4.8784
A JAN.15 (OH)	Y:	-0.0026	+0.00032	+28.0165	+0.32420	+0.000628	+0.0046
				0.451090	3.8507	0.3119	4.1584
JAN.15 (OH)	X:	-0.0011	+0.00041	+33.4273	+0.39781	+0.002687	+0.0061
(2448271.5)				4.359473	1.6979	3.5446	5.4960
A JAN.22 (OH)	Y:	-0.0028	+0.00038	+25.8596	+0.31565	+0.000999	+0.0039
				3.863665	1.0141	3.6721	4.9388
JAN.22 (OH)	X:	-0.0013	+0.00035	+31.0780	+0.38885	+0.001689	+0.0064
(2448278.5)				1.467434	5.2239	1.3374	5.9543
A JAN.29 (OH)	Y:	-0.0027	+0.00034	+23.8008	+0.30321	+0.001313	+0.0042
				0.988890	4.4691	1.4874	5.5904
JAN.29 (OH)	X:	-0.0015	+0.00030	+28.9789	+0.37230	+0.001281	+0.0060
(2448285.5)				4.848076	2.4209	4.8949	0.0052
A FEV. 5 (OH)	Y:	-0.0025	+0.00027	+21.8656	+0.28517	+0.001302	+0.0044
				4.393310	1.6136	4.9669	6.0152
FEV. 5 (OH)	X:	-0.0018	+0.00031	+27.1265	+0.35767	+0.001148	+0.0046
(2448292.5)				1.937385	5.8847	2.4397	0.3990
A FEV.12 (OH)	Y:	-0.0026	+0.00028	+20.0636	+0.26716	+0.001330	+0.0038
				1.511928	5.0320	2.2018	0.0647
FEV.12 (OH)	X:	-0.0024	+0.00035	+25.5024	+0.34282	+0.001192	+0.0035
(2448299.5)				5.302993	3.0509	0.0599	1.0083
A FEV.19 (OH)	Y:	-0.0027	+0.00029	+18.3872	+0.24970	+0.001516	+0.0028
				4.912053	2.1622	5.8272	0.5447
FEV.19 (OH)	X:	-0.0024	+0.00027	+24.0897	+0.32601	+0.000983	+0.0033
(2448306.5)				2.379640	0.1958	3.5505	1.7262
A FEV.26 (OH)	Y:	-0.0024	+0.00021	+16.8282	+0.23140	+0.001331	+0.0021
				2.027867	5.5515	2.8924	1.2217
FEV.26 (OH)	X:	-0.0024	+0.00021	+22.8671	+0.31296	+0.001440	+0.0039
(2448313.5)				5.735390	3.6213	0.9762	2.2859
A MAR. 5 (OH)	Y:	-0.0021	+0.00016	+15.3774	+0.21520	+0.001593	+0.0022
				5.427344	2.6638	0.1915	2.0120
MAR. 5 (OH)	X:	-0.0028	+0.00026	+21.8123	+0.29491	+0.000940	+0.0042
(2448320.5)				2.804445	0.7414	4.5903	2.6027
A MAR.12 (OH)	Y:	-0.0021	+0.00018	+14.0246	+0.19796	+0.001235	+0.0025
				2.544382	6.0285	3.5101	2.4436
MAR.12 (OH)	X:	-0.0030	+0.00022	+20.9032	+0.28512	+0.001501	+0.0040
(2448327.5)				6.155072	4.1453	1.6195	2.9043
A MAR.19 (OH)	Y:	-0.0019	+0.00015	+12.7613	+0.18432	+0.001581	+0.0023
				5.947442	3.1247	0.7357	2.7825
MAR.19 (OH)	X:	-0.0030	+0.00016	+20.1153	+0.26869	+0.001181	+0.0032
(2448334.5)				3.220684	1.2538	5.2895	3.2110
A MAR.26 (OH)	Y:	-0.0016	+0.00011	+11.5772	+0.16888	+0.001274	+0.0018
				3.070272	0.1893	4.0838	3.0989
MAR.26 (OH)	X:	-0.0032	+0.00017	+19.4368	+0.25814	+0.001312	+0.0022
(2448341.5)				0.286150	4.6376	2.2669	3.7636
A AVR. 2 (OH)	Y:	-0.0015	+0.00012	+10.4721	+0.15632	+0.001397	+0.0011
				0.198485	3.5441	1.1697	3.6636
AVR. 2 (OH)	X:	-0.0035	+0.00018	+18.8418	+0.24553	+0.001398	+0.0021
(2448348.5)				3.634776	1.7385	5.8215	4.5434
A AVR. 9 (OH)	Y:	-0.0014	+0.00012	+ 9.4397	+0.14287	+0.001281	+0.0010
				3.616283	0.6020	4.5935	4.5836

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DU SATELLITE 2 DE MARS: DEIMOS N= 4.9788

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AVR. 9 (OH)	X:	-0.0035	+0.00011	+18.3222	+0.23431	+0.001175	+0.0025
(2448355.5)				0.700894	5.1059	2.9029	5.1798
A AVR.16 (OH)	Y:	-0.0013	+0.00010	+ 8.4840	+0.13170	+0.001245	+0.0011
				0.759495	3.9338	1.5906	5.2833
AVR.16 (OH)	X:	-0.0035	+0.00008	+17.8553	+0.22551	+0.001454	+0.0030
(2448362.5)				4.051332	2.1989	6.2444	5.5448
A AVR.23 (OH)	Y:	-0.0010	+0.00007	+ 7.6035	+0.12022	+0.001253	+0.0012
				4.196905	0.9832	5.0154	5.6540
AVR.23 (OH)	X:	-0.0038	+0.00008	+17.4370	+0.21289	+0.001055	+0.0028
(2448369.5)				1.119461	5.5588	3.5835	5.8147
A AVR.30 (OH)	Y:	-0.0010	+0.00009	+ 6.8071	+0.11006	+0.001105	+0.0009
				1.364251	4.2924	1.9396	5.9989
AVR.30 (OH)	X:	-0.0037	+0.00002	+17.0521	+0.20777	+0.001490	+0.0024
(2448376.5)				4.472808	2.6447	0.3841	6.1834
A MAI 7 (OH)	Y:	-0.0008	+0.00007	+ 6.1026	+0.09977	+0.001162	+0.0006
				4.831462	1.3346	5.4253	0.3323
MAI 7 (OH)	X:	-0.0036	-0.00001	+16.6942	+0.19548	+0.001041	+0.0017
(2448383.5)				1.543808	5.9991	4.1050	0.4020
A MAI 14 (OH)	Y:	-0.0005	+0.00005	+ 5.5018	+0.09117	+0.001026	+0.0005
				2.033182	4.6259	2.3143	1.3895
MAI 14 (OH)	X:	-0.0036	-0.00003	+16.3553	+0.19126	+0.001300	+0.0016
(2448390.5)				4.900137	3.0778	0.8651	1.2564
A MAI 21 (OH)	Y:	-0.0003	+0.00005	+ 5.0179	+0.08221	+0.001041	+0.0007
				5.537932	1.6481	5.7556	2.0308
MAI 21 (OH)	X:	-0.0036	-0.00007	+16.0301	+0.18081	+0.001026	+0.0021
(2448397.5)				1.974110	0.1506	4.6085	1.7704
A MAI 28 (OH)	Y:	-0.0003	+0.00006	+ 4.6628	+0.07483	+0.000945	+0.0007
				2.776189	4.9225	2.6622	2.3798
MAI 28 (OH)	X:	-0.0034	-0.00011	+15.7170	+0.17745	+0.001144	+0.0024
(2448404.5)				5.333221	3.5067	1.3337	2.1259
A JUN. 4 (OH)	Y:	-0.0001	+0.00005	+ 4.4455	+0.06723	+0.000941	+0.0005
				0.026310	1.9216	6.0696	2.7604
JUN. 4 (OH)	X:	-0.0034	-0.00010	+15.4086	+0.16950	+0.001034	+0.0023
(2448411.5)				2.409893	0.5816	4.9708	2.3645
A JUN.11 (OH)	Y:	+0.0000	+0.00005	+ 4.3613	+0.06103	+0.000863	+0.0003
				3.561474	5.1747	3.0476	3.6553
JUN.11 (OH)	X:	-0.0035	-0.00010	+15.1073	+0.16493	+0.000869	+0.0017
(2448418.5)				5.771060	3.9326	1.9494	2.6521
A JUN.18 (OH)	Y:	+0.0000	+0.00007	+ 4.3991	+0.05577	+0.000889	+0.0004
				0.805915	2.1418	0.0544	4.8118
JUN.18 (OH)	X:	-0.0033	-0.00015	+14.8070	+0.16067	+0.001056	+0.0011
(2448425.5)				2.849857	1.0151	5.3196	3.2865
A JUN.25 (OH)	Y:	+0.0001	+0.00007	+ 4.5349	+0.05069	+0.000764	+0.0006
				4.318682	5.3613	3.4070	5.2390
JUN.25 (OH)	X:	-0.0033	-0.00013	+14.5131	+0.15525	+0.000764	+0.0010
(2448432.5)				6.212347	4.3642	2.5604	4.3123
A JUL. 2 (OH)	Y:	+0.0002	+0.00006	+ 4.7446	+0.04776	+0.000840	+0.0006
				1.528953	2.3038	0.3627	5.5476
JUL. 2 (OH)	X:	-0.0034	-0.00012	+14.2192	+0.15336	+0.000970	+0.0016
(2448439.5)				3.292422	1.4472	5.7204	4.9052
A JUL. 9 (OH)	Y:	+0.0004	+0.00005	+ 5.0034	+0.04481	+0.000693	+0.0004
				5.003710	5.4910	3.7319	5.9468
JUL. 9 (OH)	X:	-0.0033	-0.00016	+13.9291	+0.14788	+0.000700	+0.0018
(2448446.5)				0.372269	4.8001	3.1940	5.1418
A JUL.16 (OH)	Y:	+0.0004	+0.00006	+ 5.2914	+0.04414	+0.000827	+0.0003
				2.177164	2.4279	0.6848	0.8362

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DU SATELLITE 2 DE MARS: DEIMOS N= 4.9788

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.16 (0H)	X:	-0.0031	-0.00017	+13.6413	+0.14780	+0.000882	+0.0017
(2448453.5)				3.735789	1.8845	6.1687	5.3828
A JUL.23 (0H)	Y:	+0.0005	+0.00005	+ 5.5943	+0.04363	+0.000621	+0.0005
				5.619326	5.5988	4.0559	1.5829
JUL.23 (0H)	X:	-0.0032	-0.00014	+13.3571	+0.14351	+0.000719	+0.0013
(2448460.5)				0.815330	5.2435	3.6040	5.6062
A JUL.30 (0H)	Y:	+0.0006	+0.00004	+ 5.8992	+0.04478	+0.000758	+0.0008
				2.764987	2.5517	1.0031	1.9145
JUL.30 (0H)	X:	-0.0031	-0.00016	+13.0772	+0.14280	+0.000738	+0.0007
(2448467.5)				4.177885	2.3242	0.5486	6.2736
A AOU. 6 (0H)	Y:	+0.0006	+0.00004	+ 6.2000	+0.04610	+0.000649	+0.0008
				6.183868	5.7585	4.3925	2.0590
AOU. 6 (0H)	X:	-0.0028	-0.00019	+12.8010	+0.14128	+0.000716	+0.0008
(2448474.5)				1.256271	5.6888	4.0024	0.9595
A AOU.13 (0H)	Y:	+0.0006	+0.00005	+ 6.4879	+0.04888	+0.000673	+0.0006
				3.310693	2.7260	1.2831	2.3438
AOU.13 (0H)	X:	-0.0028	-0.00015	+12.5306	+0.14023	+0.000683	+0,0011
(2448481.5)				4.616714	2.7697	1.1831	1.5365
A AOU.20 (0H)	Y:	+0.0007	+0.00002	+ 6.7631	+0.05090	+0.000667	+0.0003
				0.430457	5.9783	4.7324	2.9476
AOU.20 (0H)	X:	-0.0028	-0.00012	+12.2666	+0.14074	+0.000724	+0.0013
(2448488.5)				1.692689	6.1372	4.4131	1.7584
A AOU.27 (0H)	Y:	+0.0007	+0.00002	+ 7.0187	+0.05472	+0.000593	+0.0004
				3.827630	2.9638	1.5574	4.4222
AOU.27 (0H)	X:	-0.0027	-0.00012	+12.0098	+0.13910	+0.000692	+0.0011
(2448495.5)				5.049828	3.2174	1.9188	1.9020
A SEP. 3 (0H)	Y:	+0.0006	+0.00001	+ 7.2559	+0.05645	+0.000729	+0.0006
				0.936284	6.2569	5.0914	4.7708
SEP. 3 (0H)	X:	-0.0026	-0.00010	+11.7619	+0.14219	+0.000730	+0.0007
(2448502.5)				2.122199	0.3027	4.8267	2.2129
A SEP.10 (0H)	Y:	+0.0006	+0.00000	+ 7.4708	+0.06127	+0.000540	+0.0007
				4.324525	3.2532	1.7666	4.9796
SEP.10 (0H)	X:	-0.0027	-0.00005	+11.5233	+0.14079	+0.000742	+0.0003
(2448509.5)				5.474720	3.6677	2.4340	2.9806
A SEP.17 (0H)	Y:	+0.0007	-0.00002	+ 7.6641	+0.06255	+0.000709	+0.0007
				1.425282	0.2844	5.3862	5.1240
SEP.17 (0H)	X:	-0.0026	-0.00004	+11.2982	+0.14448	+0.000705	+0.0006
(2448516.5)				2.541880	0.7507	5.4322	4.3207
A SEP.24 (0H)	Y:	+0.0007	-0.00003	+ 7.8343	+0.06686	+0.000560	+0.0004
				4.806841	3.5813	2.1007	5.4300
SEP.24 (0H)	X:	-0.0025	-0.00004	+11.0857	+0.14451	+0.000843	+0.0009
(2448523.5)				5.888611	4.1192	2.8919	4.5581
A OCT. 1 (0H)	Y:	+0.0007	-0.00005	+ 7.9803	+0.06800	+0.000712	+0.0003
				1.902043	0.6200	5.6587	0.5824
OCT. 1 (0H)	X:	-0.0024	+0.00000	+10.8925	+0.14877	+0.000705	+0.0011
(2448530.5)				2.949216	1.1961	6.0536	4.7242
A OCT. 8 (0H)	Y:	+0.0007	-0.00007	+ 8.1018	+0.07168	+0.000570	+0.0005
				5.278810	3.9236	2.3978	1.3129
OCT. 8 (0H)	X:	-0.0023	+0.00001	+10.7165	+0.15092	+0.000884	+0.0010
(2448537.5)				0.005720	4.5669	3.2446	4.7759
A OCT.15 (0H)	Y:	+0.0006	-0.00007	+ 8.1965	+0.07280	+0.000679	+0.0007
				2.370113	0.9646	5.8105	1.5038
OCT.15 (0H)	X:	-0.0022	+0.00002	+10.5678	+0.15403	+0.000812	+0.0007
(2448544.5)				3.341566	1.6409	0.4782	4.8558
A OCT.22 (0H)	Y:	+0.0005	-0.00008	+ 8.2652	+0.07435	+0.000615	+0.0007
				5.743422	4.2734	2.8162	1.5179

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DU SATELLITE 2 DE MARS: DEIMOS N= 4.9788

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
OCT.22 (OH)	X:	-0.0020	+0.00005	+10.4443	+0.15907	+0.000944	+0.0003
(2448551.5)				0.390339	5.0105	3.5954	5.3088
A OCT.29 (OH)	Y:	+0.0005	-0.00010	+ 8.3037	+0.07594	+0.000718	+0.0005
				2.832535	1.3116	5.9148	1.6100
OCT.29 (OH)	X:	-0.0019	+0.00008	+10.3565	+0.16165	+0.000950	+0.0002
(2448558.5)				3.717855	2.0829	0.9751	1.0555
A NOV. 5 (OH)	Y:	+0.0004	-0.00009	+ 8.3127	+0.07548	+0.000666	+0.0002
				6.204028	4.6158	3.0912	1.6553
NOV. 5 (OH)	X:	-0.0017	+0.00008	+10.3044	+0.16811	+0.000970	+0.0006
(2448565.5)				0.756708	5.4463	4.0334	1.3692
A NOV.12 (OH)	Y:	+0.0002	-0.00008	+ 8.2873	+0.07660	+0.000770	+0.0002
				3.292514	1.6443	6.0889	4.5843
NOV.12 (OH)	X:	-0.0015	+0.00013	+10.2965	+0.17061	+0.001091	+0.0008
(2448572.5)				4.078606	2.5205	1.4050	1.4272
A NOV.19 (OH)	Y:	+0.0002	-0.00011	+ 8.2271	+0.07438	+0.000732	+0.0005
				0.380933	4.9403	3.3277	4.5800
NOV.19 (OH)	X:	-0.0014	+0.00016	+10.3356	+0.17777	+0.001046	+0.0008
(2448579.5)				1.112947	5.8775	4.4436	1.5361
A NOV.26 (OH)	Y:	+0.0001	-0.00011	+ 8.1284	+0.07464	+0.000871	+0.0006
				3.754089	1.9529	0.0316	4.6491
NOV.26 (OH)	X:	-0.0012	+0.00017	+10.4257	+0.18080	+0.001168	+0.0006
(2448586.5)				4.427638	2.9497	1.7120	1.5622
A DEC. 3 (OH)	Y:	+0.0000	-0.00010	+ 7.9881	+0.07165	+0.000844	+0.0006
				0.845276	5.2294	3.4492	4.6225
DEC. 3 (OH)	X:	-0.0009	+0.00018	+10.5689	+0.18648	+0.001161	+0.0002
(2448593.5)				1.458155	0.0188	4.9182	1.8993
A DEC.10 (OH)	Y:	+0.0000	-0.00010	+ 7.8043	+0.06997	+0.000929	+0.0003
				4.222572	2.2138	0.3388	4.6030
DEC.10 (OH)	X:	-0.0008	+0.00023	+10.7660	+0.19042	+0.001237	+0.0003
(2448600.5)				4.771284	3.3699	1.9808	3.7308
A DEC.17 (OH)	Y:	+0.0000	-0.00012	+ 7.5742	+0.06734	+0.000984	+0.0001
				1.320215	5.4644	3.6103	5.6576
DEC.17 (OH)	X:	-0.0004	+0.00021	+11.0149	+0.19408	+0.001292	+0.0006
(2448607.5)				1.801958	0.4348	5.3011	4.3005
A DEC.24 (OH)	Y:	+0.0000	-0.00009	+ 7.2980	+0.06476	+0.001005	+0.0002
				4.706032	2.4096	0.6004	1.2581
DEC.24 (OH)	X:	+0.0000	+0.00019	+11.3112	+0.19800	+0.001304	+0.0009
(2448614.5)				5.117529	3.7786	2.2352	4.3744
A DEC.31 (OH)	Y:	-0.0001	-0.00007	+ 6.9757	+0.06310	+0.001117	+0.0005
				1.815481	5.6273	3.8185	1.2577
DEC.31 (OH)	X:	+0.0002	+0.00021	+11.6481	+0.19896	+0.001451	+0.0008
(2448621.5)				2.152009	0.8405	5.6901	4.3642
A JAN. 7 (OH)	Y:	-0.0001	-0.00006	+ 6.6106	+0.06122	+0.001020	+0.0004
				5.216634	2.5253	0.8371	1.2096

SATELLITES DE JUPITER

SATELLITES OF JUPITER

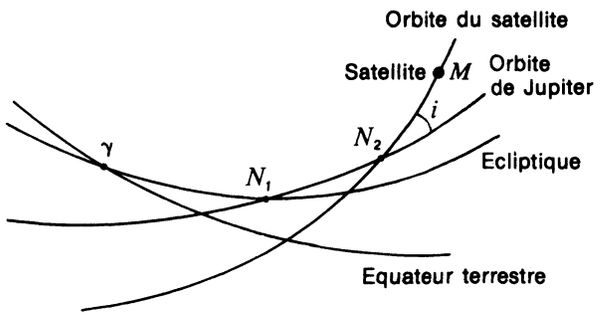
DONNÉES SUR LES SATELLITES GALILÉENS

DATA ON THE GALILEAN SATELLITES

	IO (I)	EUROPE (II)	GANYMÈDE (III)	CALLISTO (IV)
Masses (10^{-5} masse de Jupiter)				
Sampson (1921) :	4.50	2.54	7.99	4.50
De Sitter (1931) :	3.81	2.48	8.17	5.09
Pionneer 11 (1976) :	4.68	2.52	7.80	5.66
Rayons (km)				
Danjon (1954) :	1650	1400	2450	2300
Dollfus (1961) :	1775	1550	2800	2525
Pionneer 11 (1976) :	1840	1552	2650	2420
Voyager (1983) :	1816	1563	2638	2410
Magnitudes visuelles à l'opposition de Jupiter :				
Harris (1961) :	4.8	5.2	4.5	5.5
Albedos géométriques (Harris, 1961)				
U : 353 nm	0.19	0.47	0.29	0.14
B : 448 nm	0.56	0.67	0.41	0.21
V : 554 nm	0.92	0.83	0.49	0.26
R : 690 nm	1.12	0.93	0.56	0.30
I : 820 nm	1.15	0.95	0.57	0.31
Albédo de Bond (visuel)	0.54	0.49	0.29	0.15
Demi-grand axe (Sampson, 1921)				
en UA :	0.002820	0.004486	0.007155	0.012586
en rayons de Jupiter :	5.87	9.34	14.91	26.22
en kilomètres :	421810	671140	1070500	1882900
Plus grande élongation à l'opposition de Jupiter (minutes et secondes de degré)				
Sampson (1921) :	2' 17"	3' 40"	5' 48"	10' 13"
Période synodique (jours)				
Sampson (1921) :	1.7698604883	3.5540941742	7.1663872292	16.7535523007
Inclinaison moyenne sur l'équateur de Jupiter pour 1991.5 (minutes et secondes de degré)				
Sampson (1921) :	2' 02"	26' 35"	10' 23"	21' 32"
Valeur moyenne de l'excentricité pour 1991.5				
Sampson (1921) :	0.004	0.009	0.001	0.007
Partie séculaire du mouvement (degrés par an)				
nœud :	− 48.5	− 11.9	− 2.6	− 0.6
périjove :	57.0	14.6	2.7	0.7
Sampson (1921)				

Théorie du mouvement des satellites Galiléens

Theory of the motion of the Galilean satellites



(repère moyen de la date)
(mean frame of the date)

Du fait de la complexité du mouvement des satellites Galiléens, il est difficile de donner des valeurs précises sur les nœuds et les périjoves. En effet, les excentricités et les inclinaisons sont faibles (cf. tableau précédent) et tous ces éléments sont soumis à de grandes variations.

On donne ci-après les longitudes moyennes (d'après Sampson, 1921) dans le plan des orbites, ce plan étant confondu avec l'équateur de Jupiter.

Si τ est le temps en jours moyens compté à partir de 1900,0 on a :

Because of the complexity of the motion of the Galilean satellites of Jupiter it is difficult to provide precise values for nodes and perijoves. Indeed, eccentricities and inclinations are small (see the preceding table) and all these elements undergo large variations.

The mean longitudes (Sampson, 1921) in the orbital planes identified with Jupiter's equator are given below.

If τ is the time in days which has elapsed from 1900.0, one gets :

$$\gamma N_1 N_2 = 316.051^\circ + 0.00003559\,\tau,\ i = 3.10350^\circ$$

	$\gamma N_1 + N_1N_2 + N_2M$	Période sidérale en jours *Sidereal period in days*
Io	142.59987° + 203.488992435 τ	1.7691374639
Europe	99.55081° + 101.374761672 τ	3.5511797420
Ganymède	168.02628° + 50.317646290 τ	7.1545476894
Callisto	234.40790° + 21.571109630 τ	16.6889884746

DONNÉES SUR L'ENSEMBLE DES SATELLITES DE JUPITER

DATA ON THE GALILEAN AND OTHER SATELLITES OF JUPITER

	NOM	masse	rayon	période rotation sidérale	albédo géométrique	magnitude visuelle	période orbitale	élongation maximale	1/2 grand axe	excentricité	inclinaison sur l'équateur de Jupiter
	unité →	masse de Jupiter	km	jour			jour	(°) (') (")	10^3 km		degré
I	Io	4.70×10^{-5}	1 815	(S)	0.61	5.02	1.769 137	2 18	422	0.004	0.04
II	Europa	2.56×10^{-5}	1 569	(S)	0.64	5.29	3.551 181	3 40	671	0.009	0.47
III	Ganymede	7.84×10^{-5}	2 631	(S)	0.42	4.61	7.154 552	5 51	1 070	0.002	0.21
IV	Callisto	5.6×10^{-5}	2 400	(S)	0.20	5.65	16.689 018	10 18	1 883	0.007	0.51
V	Amalthea	$38. \times 10^{-10}$	$135 \times 85 \times 75$	(S)	0.05	14.1	0.498 179	59	181	0.003	0.40
VI	Himalia	$50. \times 10^{-10}$	90	0.4	0.03	14.84	250.566 2	1 02 46	11 480	0.158	27.63 (1) (2)
VII	Elara	$4. \times 10^{-10}$	40	0.5	0.03	16.77	259.652 8	1 04 10	11 737	0.207	24.77 (1) (2)
VIII	Pasiphae	$1. \times 10^{-10}$				17.0	735. (R)	2 08 26	23 500	0.378	145. (1) (2)
IX	Sinope	0.4×10^{-10}	15			18.3	758. (R)	2 09 31	23 700	0.275	153. (1) (2)
X	Lysithea	0.4×10^{-10}	10			18.4	259.22	1 04 04	11 720	0.107	29.02 (2)
XI	Carme	0.5×10^{-10}	15			18.0	692. (R)	2 03 31	22 600	0.207	164. (2)
XII	Ananke	0.2×10^{-10}	10			18.9	631. (R)	1 55 52	21 200	0.169	147. (2)
XIII	Leda	0.03×10^{-10}	8			20.	238.72	1 00 39	11 094	0.148	26.07 (2)
XIV	Thebe	$4. \times 10^{-10}$	40		0.05	16.0	0.674 55	1 13	221		
XV	Adrastea	0.1×10^{-10}	10		0.05	18.9	0.298	42	129		
XVI	Metis	0.5×10^{-10}	20		0.05	17.5	0.294 79	42	128		
	NAME	*mass*	*radius*	*sidereal rotation*	*geometrical albedo*	*visual magnitude*	*orbital period*	*greatest elongation*	*semi major axis*	*eccentricity*	*inclination on Jupiter's equator*
	unit →	*Jupiter's mass*	*km*	*day*			*day*	*(°) (') (")*	*10^3 km*		*degree*

NOTES

(S) : révolution synchrone
(R) : révolution rétrograde
(1) : les éphémérides des satellites VI, VII, VIII et IX sont données sous forme de coefficients de Tchébycheff dans le supplément à la Connaissance des Temps « Satellites faibles... »
(2) : inclinaison sur l'orbite de Jupiter

(S) : synchronous revolution
(R) : retrograde revolution
(1) : the ephemerides for satellites VI, VII, VIII and IX are given as Chebychev coefficients in the Supplément à la Connaissance des Temps « Faint Satellites... »
(2) : inclination on Jupiter's orbit

Données extraites de l'*Encyclopédie du Bureau des Longitudes.*

Data from the Encyclopédie du Bureau des Longitudes.

ÉPHÉMÉRIDES DES SATELLITES GALILÉENS

EPHEMERIDES OF THE GALILEAN SATELLITES

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000.

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000.

$$\Delta\alpha \cos\delta = X$$
$$\Delta\delta = Y$$

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of beginning of the interval anbd T the date for the calculation

satellite	intervalle Δt (jours)	N (rad/j)	page
Io	4	3.551 6	30
Europe	5	1.769 3	37
Ganymède	8	0.878 2	43
Callisto	8	0.376 5	47
	(days)	*(rad/d)*	

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE JUPITER: IO N=3.5516

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (0H)	X:	+0.0675	-0.00365	+124.8667	+0.34226	+0.004384	+0.2996
(2448257.5)				2.635690	3.3771	5.0573	2.0777
A JAN. 5 (0H)	Y:	-0.0185	+0.00142	+ 41.3370	+0.07733		+0.0978
				5.760515	1.0271		5.2086
JAN. 5 (0H)	X:	+0.0431	-0.00881	+125.8329	+0.34191	+0.002520	+0.3010
(2448261.5)				4.283246	5.1514	1.6031	5.4135
A JAN. 9 (0H)	Y:	-0.0103	+0.00283	+ 41.3447	+0.08211		+0.0983
				1.124764	2.8793		2.2620
JAN. 9 (0H)	X:	+0.0103	-0.00781	+126.6734	+0.34974	+0.006123	+0.3033
(2448265.5)				5.931336	0.5933	3.4705	2.4593
A JAN.13 (0H)	Y:	+0.0022	+0.00242	+ 41.2848	+0.08856		+0.0994
				2.772621	4.7180		5.5814
JAN.13 (0H)	X:	-0.0220	-0.01118	+127.4086	+0.33301	+0.005656	+0.3053
(2448269.5)				1.296753	2.3106	4.4966	5.8008
A JAN.17 (0H)	Y:	+0.0120	+0.00370	+ 41.1530	+0.09781		+0.0980
				4.420744	0.2220		2.6312
JAN.17 (0H)	X:	-0.0515	-0.01140	+128.0299	+0.31115	+0.005681	+0.3071
(2448273.5)				2.945692	4.0714	5.6964	2.8489
A JAN.21 (0H)	Y:	+0.0202	+0.00375	+ 40.9623	+0.10880		+0.0973
				6.069152	2.0283		5.9815
JAN.21 (0H)	X:	-0.0967	-0.00832	+128.4945	+0.28856	+0.008542	+0.3080
(2448277.5)				4.594907	5.8032	0.7272	6.1878
A JAN.25 (0H)	Y:	+0.0339	+0.00257	+ 40.6955	+0.11812		+0.0978
				1.434469	3.7707		3.0295
JAN.25 (0H)	X:	-0.1247	-0.00928	+128.8177	+0.28608	+0.005916	+0.3089
(2448281.5)				6.244036	1.3215	2.3075	3.2354
A JAN.29 (0H)	Y:	+0.0441	+0.00266	+ 40.3704	+0.12751		+0.0962
				3.082964	5.5054		0.0648
JAN.29 (0H)	X:	-0.1710	-0.00381	+128.9932	+0.30281	+0.004312	+0.3101
(2448285.5)				1.609881	3.1095	4.9485	0.2885
A FEV. 2 (0H)	Y:	+0.0577	+0.00116	+ 39.9873	+0.13641		+0.0952
				4.731328	0.9351		3.4032
FEV. 2 (0H)	X:	-0.1955	-0.00691	+129.0179	+0.29891	+0.004764	+0.3084
(2448289.5)				3.259016	4.8872	0.5725	3.6207
A FEV. 6 (0H)	Y:	+0.0641	+0.00195	+ 39.5554	+0.14398		+0.0937
				0.096433	2.6536		0.4595
FEV. 6 (0H)	X:	-0.2285	-0.00586	+128.8850	+0.30916	+0.008577	+0.3085
(2448293.5)				4.907868	0.3693	2.8422	0.6670
A FEV.10 (0H)	Y:	+0.0751	+0.00142	+ 39.0762	+0.14748		+0.0933
				1.744552	4.3722		3.7977
FEV.10 (0H)	X:	-0.2544	-0.00948	+128.5974	+0.29296	+0.008365	+0.3054
(2448297.5)				0.273341	2.1277	4.2134	4.0053
A FEV.14 (0H)	Y:	+0.0820	+0.00268	+ 38.5602	+0.15149		+0.0919
				3.392163	6.0685		0.8399
FEV.14 (0H)	X:	-0.2823	-0.01028	+128.1784	+0.27172	+0.004823	+0.3041
(2448301.5)				1.921632	3.9654	5.1918	1.0515
A FEV.18 (0H)	Y:	+0.0886	+0.00284	+ 38.0180	+0.15390		+0.0894
				5.039432	1.4905		4.1668
FEV.18 (0H)	X:	-0.3175	-0.00954	+127.6073	+0.27029	+0.006505	+0.3027
(2448305.5)				3.569242	5.7418	0.5800	4.3895
A FEV.22 (0H)	Y:	+0.0978	+0.00257	+ 37.4536	+0.15520		+0.0883
				0.402868	3.1831		1.2256
FEV.22 (0H)	X:	-0.3461	-0.00860	+126.9070	+0.27245	+0.004272	+0.2995
(2448309.5)				5.216264	1.2828	1.8602	1.4365
A FEV.26 (0H)	Y:	+0.1055	+0.00224	+ 36.8748	+0.15341		+0.0866
				2.048891	4.8700		4.5513

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE JUPITER: IO N=3.5516

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
FEV.26 (OH)	X:	-0.3840	-0.00500	+126.0891	+0.29181	+0.000900	+0.2981
(2448313.5)				0.579306	3.0679	4.0220	4.7667
A MAR. 2 (OH)	Y:	+0.1151	+0.00122	+ 36.2931	+0.15066		+0.0856
				3.694210	0.2695		1.6007
MAR. 2 (OH)	X:	-0.4080	-0.00522	+125.1452	+0.30129	+0.005367	+0.2940
(2448317.5)				2.224752	4.7719	0.0756	1.8161
A MAR. 6 (OH)	Y:	+0.1208	+0.00122	+ 35.7155	+0.14738		+0.0836
				5.338829	1.9555		4.9254
MAR. 6 (OH)	X:	-0.4388	-0.00312	+124.1060	+0.31436	+0.007783	+0.2918
(2448321.5)				3.869494	0.2328	2.1334	5.1439
A MAR.10 (OH)	Y:	+0.1298	+0.00048	+ 35.1430	+0.14009		+0.0813
				0.699633	3.6513		1.9771
MAR.10 (OH)	X:	-0.4550	-0.00666	+122.9688	+0.31367	+0.008228	+0.2861
(2448325.5)				5.513397	1.9790	3.6661	2.1897
A MAR.14 (OH)	Y:	+0.1335	+0.00169	+ 34.5901	+0.13433		+0.0803
				2.342729	5.3411		5.3102
MAR.14 (OH)	X:	-0.4800	-0.00567	+121.7586	+0.30876	+0.006373	+0.2831
(2448329.5)				0.873275	3.7594	4.7873	5.5166
A MAR.18 (OH)	Y:	+0.1387	+0.00144	+ 34.0564	+0.12685		+0.0794
				3.985059	0.7503		2.3400
MAR.18 (OH)	X:	-0.4972	-0.00900	+120.5028	+0.33116	+0.003465	+0.2783
(2448333.5)				2.515397	5.5291	0.5588	2.5667
A MAR.22 (OH)	Y:	+0.1428	+0.00226	+ 33.5517	+0.12044		+0.0775
				5.626542	2.4474		5.6703
MAR.22 (OH)	X:	-0.5219	-0.00627	+119.1735	+0.33785	+0.001348	+0.2738
(2448337.5)				4.156579	1.0074	1.1754	5.8880
A MAR.26 (OH)	Y:	+0.1494	+0.00162	+ 33.0725	+0.11218		+0.0757
				0.984026	4.1499		2.7123
MAR.26 (OH)	X:	-0.5457	-0.00505	+117.8058	+0.34859	+0.002247	+0.2709
(2448341.5)				5.796740	2.7415	1.3022	2.9325
A MAR.30 (OH)	Y:	+0.1545	+0.00140	+ 32.6241	+0.10309		+0.0746
				2.623753	5.8394		6.0477
MAR.30 (OH)	X:	-0.5634	-0.00344	+116.4126	+0.35831	+0.003370	+0.2647
(2448345.5)				1.152598	4.3827	6.0613	6.2536
A AVR. 3 (OH)	Y:	+0.1589	+0.00093	+ 32.2129	+0.09557		+0.0737
				4.262722	1.2650		3.0790
AVR. 3 (OH)	X:	-0.5869	+0.00010	+114.9901	+0.35787	+0.005637	+0.2612
(2448349.5)				2.790882	6.0716	1.1109	3.2926
A AVR. 7 (OH)	Y:	+0.1658	-0.00013	+ 31.8343	+0.08774		+0.0720
				5.900898	2.9801		0.1097
AVR. 7 (OH)	X:	-0.5925	-0.00305	+113.5649	+0.36752	+0.006458	+0.2554
(2448353.5)				4.428312	1.4902	2.9730	0.3331
A AVR.11 (OH)	Y:	+0.1684	+0.00082	+ 31.4923	+0.08120		+0.0706
				1.255268	4.7375		3.4513
AVR.11 (OH)	X:	-0.6089	-0.00019	+112.1300	+0.36780	+0.006125	+0.2505
(2448357.5)				6.064834	3.1989	4.4366	3.6519
A AVR.15 (OH)	Y:	+0.1723	+0.00025	+ 31.1849	+0.07456		+0.0704
				2.891879	0.1936		0.4873
AVR.15 (OH)	X:	-0.6105	-0.00494	+110.7045	+0.37795	+0.001593	+0.2458
(2448361.5)				1.417384	4.9378	5.7445	0.6949
A AVR.19 (OH)	Y:	+0.1727	+0.00150	+ 30.9150	+0.07014		+0.0691
				4.527840	1.9547		3.8043
AVR.19 (OH)	X:	-0.6208	-0.00277	+109.2967	+0.39158	+0.000802	+0.2407
(2448365.5)				3.052200	0.3550	3.9264	4.0155
A AVR.23 (OH)	Y:	+0.1769	+0.00091	+ 30.6794	+0.06635		+0.0677
				6.163028	3.7192		0.8379

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AVR.23 (OH)	X:	-0.6298	-0.00298	+107.8963	+0.39503	+0.002388	+0.2372
(2448369.5)				4.686163	2.0532	6.2607	1.0579
A AVR.27 (OH)	Y:	+0.1796	+0.00118	+ 30.4780	+0.06355		+0.0668
				1.514302	5.4833		4.1663
AVR.27 (OH)	X:	-0.6340	-0.00129	+106.5252	+0.39582	+0.001529	+0.2322
(2448373.5)				0.036026	3.7003	0.1732	4.3721
A MAI 1 (OH)	Y:	+0.1813	+0.00073	+ 30.3073	+0.06105		+0.0666
				3.148103	0.9832		1.2061
MAI 1 (OH)	X:	-0.6444	+0.00199	+105.1820	+0.38958	+0.004832	+0.2287
(2448377.5)				1.668320	5.3329	0.4846	1.4125
A MAI 5 (OH)	Y:	+0.1852	-0.00021	+ 30.1717	+0.06162		+0.0660
				4.781311	2.7432		4.5185
MAI 5 (OH)	X:	-0.6402	+0.00128	+103.8622	+0.39050	+0.003707	+0.2228
(2448381.5)				3.300135	0.7455	2.0603	4.7315
A MAI 9 (OH)	Y:	+0.1863	-0.00011	+ 30.0614	+0.06268		+0.0641
				0.130791	4.5248		1.5626
MAI 9 (OH)	X:	-0.6429	+0.00374	+102.5788	+0.38931	+0.003857	+0.2193
(2448385.5)				4.931194	2.4228	3.6242	1.7634
A MAI 13 (OH)	Y:	+0.1890	-0.00067	+ 29.9827	+0.06586		+0.0645
				1.762889	6.2733		4.8843
MAI 13 (OH)	X:	-0.6326	+0.00104	+101.3349	+0.38745	+0.003311	+0.2144
(2448389.5)				0.278416	4.1033	4.8533	5.0888
A MAI 17 (OH)	Y:	+0.1870	+0.00021	+ 29.9297	+0.06833		+0.0641
				3.394360	1.7247		1.9172
MAI 17 (OH)	X:	-0.6261	+0.00166	+100.1383	+0.40681	+0.002074	+0.2100
(2448393.5)				1.908391	5.8014	3.0988	2.1189
A MAI 21 (OH)	Y:	+0.1871	-0.00007	+ 29.9047	+0.07193		+0.0634
				5.025369	3.4315		5.2338
MAI 21 (OH)	X:	-0.6162	-0.00006	+ 98.9727	+0.40520	+0.002364	+0.2066
(2448397.5)				3.537587	1.1851	4.7951	5.4433
A MAI 25 (OH)	Y:	+0.1860	+0.00054	+ 29.9014	+0.07549		+0.0628
				0.372661	5.1402		2.2755
MAI 25 (OH)	X:	-0.6077	+0.00168	+ 97.8496	+0.39738	+0.001363	+0.2027
(2448401.5)				5.166174	2.8379	6.2061	2.4750
A MAI 29 (OH)	Y:	+0.1852	+0.00005	+ 29.9201	+0.07800		+0.0622
				2.002595	0.5575		5.5984
MAI 29 (OH)	X:	-0.5999	+0.00259	+ 96.7826	+0.39856	+0.003141	+0.1998
(2448405.5)				0.511136	4.4714	0.5466	5.7910
A JUN. 2 (OH)	Y:	+0.1844	-0.00019	+ 29.9609	+0.08183		+0.0626
				3.632198	2.2440		2.6281
JUN. 2 (OH)	X:	-0.5871	+0.00502	+ 95.7444	+0.38310	+0.002909	+0.1956
(2448409.5)				2.138826	6.1331	0.8249	2.8261
A JUN. 6 (OH)	Y:	+0.1827	-0.00102	+ 30.0223	+0.08587		+0.0614
				5.261404	3.9093		5.9470
JUN. 6 (OH)	X:	-0.5753	+0.00616	+ 94.7525	+0.37767	+0.003654	+0.1922
(2448413.5)				3.766164	1.5189	2.2291	6.1412
A JUN.10 (OH)	Y:	+0.1819	-0.00150	+ 30.0983	+0.09097		+0.0614
				0.607100	5.5893		2.9947
JUN.10 (OH)	X:	-0.5532	+0.00569	+ 93.8138	+0.38097	+0.002744	+0.1884
(2448417.5)				5.393111	3.1808	4.1926	3.1812
A JUN.14 (OH)	Y:	+0.1774	-0.00124	+ 30.1956	+0.09496		+0.0614
				2.235571	0.9624		0.0264
JUN.14 (OH)	X:	-0.5368	+0.00659	+ 92.9193	+0.38713	+0.001087	+0.1858
(2448421.5)				0.736555	4.8671	2.8897	0.2117
A JUN.18 (OH)	Y:	+0.1740	-0.00159	+ 30.3089	+0.09825		+0.0610
				3.863696	2.6157		3.3400

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUN.18 (OH)	X:	-0.5076	+0.00336	+ 92.0783	+0.39593	+0.003121	+0.1824
(2448425.5)				2.362818	0.2352	3.5430	3.5391
A JUN.22 (OH)	Y:	+0.1669	-0.00057	+ 30.4375	+0.10187		+0.0608
				5.491539	4.2664		0.3816
JUN.22 (OH)	X:	-0.4893	+0.00555	+ 91.2750	+0.38876	+0.002697	+0.1794
(2448429.5)				3.988627	1.8830	4.8859	0.5699
A JUN.26 (OH)	Y:	+0.1630	-0.00128	+ 30.5795	+0.10501		+0.0603
				0.835873	5.9191		3.6996
JUN.26 (OH)	X:	-0.4620	+0.00340	+ 90.5161	+0.38070	+0.002153	+0.1780
(2448433.5)				5.614175	3.5437	0.5639	3.8916
A JUN.30 (OH)	Y:	+0.1556	-0.00059	+ 30.7341	+0.10734		+0.0608
				2.463111	1.2914		0.7432
JUN.30 (OH)	X:	-0.4412	+0.00675	+ 89.8120	+0.36977	+0.002267	+0.1740
(2448437.5)				0.956274	5.1723	0.4347	0.9270
A JUL. 4 (OH)	Y:	+0.1505	-0.00175	+ 30.9033	+0.11092		+0.0601
				4.090221	2.9333		4.0561
JUL. 4 (OH)	X:	-0.4182	+0.00773	+ 89.1410	+0.35446	+0.004078	+0.1722
(2448441.5)				2.581359	0.5524	1.1090	4.2416
A JUL. 8 (OH)	Y:	+0.1444	-0.00223	+ 31.0838	+0.11424		+0.0600
				5.717103	4.5735		1.1001
JUL. 8 (OH)	X:	-0.3878	+0.00849	+ 88.5253	+0.35957	+0.002161	+0.1687
(2448445.5)				4.206384	2.2188	2.8299	1.2839
A JUL.12 (OH)	Y:	+0.1368	-0.00260	+ 31.2750	+0.11847		+0.0605
				1.060693	6.2163		4.4253
JUL.12 (OH)	X:	-0.3633	+0.01023	+ 87.9607	+0.36528	+0.000956	+0.1669
(2448449.5)				5.831215	3.8735	5.5130	4.6016
A JUL.16 (OH)	Y:	+0.1298	-0.00319	+ 31.4804	+0.12085		+0.0603
				2.687217	1.5673		1.4567
JUL.16 (OH)	X:	-0.3243	+0.00716	+ 87.4318	+0.37041	+0.002651	+0.1650
(2448453.5)				1.172723	5.5539	3.0013	1.6426
A JUL.20 (OH)	Y:	+0.1178	-0.00219	+ 31.6946	+0.12311		+0.0604
				4.313601	3.2064		4.7864
JUL.20 (OH)	X:	-0.2962	+0.00853	+ 86.9582	+0.37067	+0.003493	+0.1630
(2448457.5)				2.797186	0.9086	4.0430	4.9631
A JUL.24 (OH)	Y:	+0.1093	-0.00272	+ 31.9190	+0.12556		+0.0602
				5.939875	4.8469		1.8191
JUL.24 (OH)	X:	-0.2578	+0.00552	+ 86.5268	+0.35966	+0.002319	+0.1622
(2448461.5)				4.421458	2.5524	5.3058	2.0023
A JUL.28 (OH)	Y:	+0.0964	-0.00165	+ 32.1539	+0.12694		+0.0605
				1.282811	0.2036		5.1500
JUL.28 (OH)	X:	-0.2286	+0.00748	+ 86.1384	+0.34948	+0.001195	+0.1603
(2448465.5)				6.045700	4.2071	0.1474	5.3226
A AOU. 1 (OH)	Y:	+0.0869	-0.00247	+ 32.3972	+0.12887		+0.0608
				2.908910	1.8461		2.1851
AOU. 1 (OH)	X:	-0.1965	+0.00764	+ 85.7990	+0.33389	+0.003943	+0.1601
(2448469.5)				1.386679	5.8451	0.3230	2.3600
A AOU. 5 (OH)	Y:	+0.0754	-0.00255	+ 32.6511	+0.13220		+0.0607
				4.535054	3.4786		5.5113
AOU. 5 (OH)	X:	-0.1648	+0.00969	+ 85.4964	+0.33495	+0.002505	+0.1574
(2448473.5)				3.010981	1.2439	1.6105	5.6836
A AOU. 9 (OH)	Y:	+0.0649	-0.00354	+ 32.9129	+0.13455		+0.0609
				6.161110	5.1180		2.5595
AOU. 9 (OH)	X:	-0.1327	+0.01057	+ 85.2454	+0.34294	+0.000364	+0.1571
(2448477.5)				4.635287	2.9144	0.6566	2.7207
A AOU.13 (OH)	Y:	+0.0539	-0.00394	+ 33.1853	+0.13713		+0.0615
				1.504006	0.4715		5.8707

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AOU.13 (OH)	X:	-0.0952	+0.01036	+ 85.0470	+0.33818	+0.000356	+0.1562
(2448481.5)				6.259466	4.5626	4.1669	6.0530
A AOU.17 (OH)	Y:	+0.0403	-0.00388	+ 33.4695	+0.13814		+0.0617
				3.130023	2.1031		2.9234
AOU.17 (OH)	X:	-0.0599	+0.00976	+ 84.8913	+0.34882	+0.003109	+0.1549
(2448485.5)				1.600643	6.2162	3.0434	3.0873
A AOU.21 (OH)	Y:	+0.0272	-0.00377	+ 33.7608	+0.13961		+0.0621
				4.756114	3.7415		6.2394
AOU.21 (OH)	X:	-0.0193	+0.00759	+ 84.7816	+0.34771	+0.004405	+0.1555
(2448489.5)				3.224927	1.5773	4.3760	0.1318
A AOU.25 (OH)	Y:	+0.0117	-0.00287	+ 34.0608	+0.14129		+0.0624
				0.099067	5.3836		3.2854
AOU.25 (OH)	X:	+0.0142	+0.00790	+ 84.7125	+0.32761	+0.001197	+0.1542
(2448493.5)				4.849125	3.2426	5.1569	3.4537
A AOU.29 (OH)	Y:	-0.0017	-0.00312	+ 34.3699	+0.14173		+0.0629
				1.725193	0.7468		0.3311
AOU.29 (OH)	X:	+0.0524	+0.00594	+ 84.6941	+0.32156	+0.001804	+0.1547
(2448497.5)				0.190419	4.8965	6.0985	0.4937
A SEP. 2 (OH)	Y:	-0.0171	-0.00236	+ 34.6888	+0.14345		+0.0635
				3.351536	2.3879		3.6508
SEP. 2 (OH)	X:	+0.0808	+0.00915	+ 84.7195	+0.31320	+0.002988	+0.1540
(2448501.5)				1.815006	0.2819	0.6459	3.8171
A SEP. 6 (OH)	Y:	-0.0292	-0.00376	+ 35.0190	+0.14572		+0.0638
				4.978045	4.0199		0.7041
SEP. 6 (OH)	X:	+0.1153	+0.00818	+ 84.7871	+0.31462	+0.002498	+0.1538
(2448505.5)				3.439803	1.9683	1.6582	0.8572
A SEP.10 (OH)	Y:	-0.0431	-0.00354	+ 35.3562	+0.14764		+0.0650
				0.321447	5.6656		4.0239
SEP.10 (OH)	X:	+0.1465	+0.01084	+ 84.9141	+0.32272	+0.000999	+0.1541
(2448509.5)				5.064814	3.6090	5.3404	4.1880
A SEP.14 (OH)	Y:	-0.0560	-0.00462	+ 35.7067	+0.14895		+0.0652
				1.948213	1.0229		1.0720
SEP.14 (OH)	X:	+0.1802	+0.00956	+ 85.0854	+0.32782	+0.002317	+0.1547
(2448513.5)				0.406785	5.2698	1.8291	1.2277
A SEP.18 (OH)	Y:	-0.0704	-0.00420	+ 36.0686	+0.14907		+0.0662
				3.575130	2.6615		4.3977
SEP.18 (OH)	X:	+0.2185	+0.00804	+ 85.3034	+0.33338	+0.004570	+0.1563
(2448517.5)				2.032167	0.6414	3.4533	4.5597
A SEP.22 (OH)	Y:	-0.0864	-0.00357	+ 36.4378	+0.14984		+0.0668
				5.202248	4.3120		1.4407
SEP.22 (OH)	X:	+0.2479	+0.00784	+ 85.5694	+0.31822	+0.002854	+0.1565
(2448521.5)				3.657585	2.3020	4.4122	1.5957
A SEP.26 (OH)	Y:	-0.1000	-0.00347	+ 36.8189	+0.15058		+0.0673
				0.546394	5.9618		4.7720
SEP.26 (OH)	X:	+0.2863	+0.00450	+ 85.8792	+0.30518	+0.001273	+0.1588
(2448525.5)				5.283286	3.9930	4.5848	4.9248
A SEP.30 (OH)	Y:	-0.1172	-0.00210	+ 37.2110	+0.15061		+0.0690
				2.173962	1.3305		1.8140
SEP.30 (OH)	X:	+0.3101	+0.00690	+ 86.2438	+0.30346	+0.002326	+0.1590
(2448529.5)				0.626272	5.6513	0.0380	1.9701
A OCT. 4 (OH)	Y:	-0.1287	-0.00316	+ 37.6143	+0.15271		+0.0691
				3.801945	2.9765		5.1475
OCT. 4 (OH)	X:	+0.3412	+0.00507	+ 86.6508	+0.29989	+0.003114	+0.1607
(2448533.5)				2.252689	1.0563	1.1414	5.2890
A OCT. 8 (OH)	Y:	-0.1433	-0.00249	+ 38.0299	+0.15407		+0.0708
				5.430170	4.6242		2.1895

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
OCT. 8 (OH)	X:	+0.3639	+0.00803	+ 87.1090	+0.30796	+0.000929	+0.1619
(2448537.5)				3.879512	2.7368	2.1071	2.3420
A OCT.12 (OH)	Y:	-0.1537	-0.00385	+ 38.4571	+0.15490		+0.0718
				0.775515	6.2790		5.5184
OCT.12 (OH)	X:	+0.3888	+0.00772	+ 87.6306	+0.31639	+0.002810	+0.1634
(2448541.5)				5.506779	4.3662	0.3195	5.6649
A OCT.16 (OH)	Y:	-0.1660	-0.00369	+ 38.9001	+0.15491		+0.0730
				2.404427	1.6444		2.5639
OCT.16 (OH)	X:	+0.4171	+0.00751	+ 88.1872	+0.32113	+0.003649	+0.1659
(2448545.5)				0.851147	6.0487	2.4062	2.7138
A OCT.20 (OH)	Y:	-0.1790	-0.00370	+ 39.3537	+0.15469		+0.0746
				4.033670	3.3000		5.8885
OCT.20 (OH)	X:	+0.4399	+0.00663	+ 88.7983	+0.31582	+0.003524	+0.1681
(2448549.5)				2.479033	1.4398	3.7538	6.0365
A OCT.24 (OH)	Y:	-0.1900	-0.00324	+ 39.8163	+0.15576		+0.0752
				5.663301	4.9693		2.9374
OCT.24 (OH)	X:	+0.4693	+0.00399	+ 89.4678	+0.29995	+0.003353	+0.1708
(2448553.5)				4.107311	3.1135	4.3779	3.0791
A OCT.28 (OH)	Y:	-0.2047	-0.00199	+ 40.2972	+0.15504		+0.0774
				1.010160	0.3481		6.2696
OCT.28 (OH)	X:	+0.4873	+0.00377	+ 90.1737	+0.30094	+0.001114	+0.1727
(2448557.5)				5.736186	4.8249	5.4207	0.1229
A NOV. 1 (OH)	Y:	-0.2143	-0.00200	+ 40.7885	+0.15540		+0.0782
				2.640727	2.0111		3.3097
NOV. 1 (OH)	X:	+0.5103	+0.00221	+ 90.9343	+0.29836	+0.002501	+0.1759
(2448561.5)				1.082410	0.2326	0.1167	3.4463
A NOV. 5 (OH)	Y:	-0.2264	-0.00126	+ 41.2925	+0.15749		+0.0800
				4.271854	3.6692		0.3588
NOV. 5 (OH)	X:	+0.5219	+0.00412	+ 91.7433	+0.30277	+0.001979	+0.1780
(2448565.5)				2.712382	1.9177	1.7156	0.4953
A NOV. 9 (OH)	Y:	-0.2327	-0.00228	+ 41.8104	+0.15815		+0.0816
				5.903407	5.3374		3.6886
NOV. 9 (OH)	X:	+0.5388	+0.00349	+ 92.6048	+0.31732	+0.002891	+0.1813
(2448569.5)				4.343017	3.5717	5.9770	3.8169
A NOV.13 (OH)	Y:	-0.2420	-0.00192	+ 42.3438	+0.15728		+0.0832
				1.252309	0.7255		0.7331
NOV.13 (OH)	X:	+0.5481	+0.00593	+ 93.5238	+0.31205	+0.003321	+0.1848
(2448573.5)				5.974134	5.2384	0.8896	0.8711
A NOV.17 (OH)	Y:	-0.2477	-0.00308	+ 42.8907	+0.15698		+0.0853
				2.885011	2.3916		4.0640
NOV.17 (OH)	X:	+0.5641	+0.00367	+ 94.4781	+0.31310	+0.004055	+0.1877
(2448577.5)				1.322695	0.6402	2.5283	4.1954
A NOV.21 (OH)	Y:	-0.2554	-0.00216	+ 43.4472	+0.15650		+0.0858
				4.518226	4.0736		1.1031
NOV.21 (OH)	X:	+0.5763	+0.00370	+ 95.4790	+0.31303	+0.005406	+0.1927
(2448581.5)				2.955086	2.3252	4.1267	1.2389
A NOV.25 (OH)	Y:	-0.2623	-0.00190	+ 44.0139	+0.15759		+0.0884
				6.152119	5.7578		4.4422
NOV.25 (OH)	X:	+0.5872	+0.00114	+ 96.5259	+0.30329	+0.001971	+0.1949
(2448585.5)				4.588040	4.0707	4.8371	4.5705
A NOV.29 (OH)	Y:	-0.2693	-0.00080	+ 44.5957	+0.15640		+0.0904
				1.503419	1.1596		1.4857
NOV.29 (OH)	X:	+0.5994	-0.00080	+ 97.6073	+0.30731	+0.001705	+0.1992
(2448589.5)				6.221864	5.7933	5.0400	1.6124
A DEC. 3 (OH)	Y:	-0.2763	+0.00011	+ 45.1846	+0.15725		+0.0920
				3.138691	2.8383		4.8150

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE JUPITER: IO N=3.5516

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
DEC. 3 (0H)	X:	+0.5989	+0.00032	+ 98.7349	+0.30938	+0.001365	+0.2022
(2448593.5)				1.573323	1.1914	1.0197	4.9461
A DEC. 7 (0H)	Y:	-0.2778	-0.00052	+ 45.7844	+0.15748		+0.0939
				4.774670	4.5181		1.8662
DEC. 7 (0H)	X:	+0.6073	-0.00200	+ 99.8976	+0.31562	+0.000821	+0.2066
(2448597.5)				3.208730	2.8774	4.8006	1.9911
A DEC.11 (0H)	Y:	-0.2829	+0.00057	+ 46.3933	+0.15634		+0.0958
				0.128141	6.2072		5.1955
DEC.11 (0H)	X:	+0.5986	+0.00242	+101.0951	+0.31899	+0.005081	+0.2105
(2448601.5)				4.845039	4.5265	0.0749	5.3250
A DEC.15 (0H)	Y:	-0.2811	-0.00143	+ 47.0065	+0.15549		+0.0987
				1.765554	1.6204		2.2467
DEC.15 (0H)	X:	+0.6026	-0.00020	+102.3182	+0.31547	+0.005880	+0.2147
(2448605.5)				0.198849	6.2238	1.5830	2.3708
A DEC.19 (0H)	Y:	-0.2836	-0.00042	+ 47.6242	+0.15396		+0.1004
				3.403755	3.3121		5.5654
DEC.19 (0H)	X:	+0.5975	+0.00210	+103.5555	+0.31912	+0.005745	+0.2205
(2448609.5)				1.836639	1.6616	3.4162	5.7030
A DEC.23 (0H)	Y:	-0.2813	-0.00130	+ 48.2378	+0.15410		+0.1020
				5.042611	5.0296		2.6271
DEC.23 (0H)	X:	+0.5973	-0.00087	+104.8177	+0.31273	+0.003589	+0.2240
(2448613.5)				3.475247	3.4085	4.6839	2.7478
A DEC.27 (0H)	Y:	-0.2835	+0.00023	+ 48.8547	+0.15237		+0.1045
				0.399160	0.4524		5.9618
DEC.27 (0H)	X:	+0.5976	-0.00309	+106.0831	+0.31724	+0.001696	+0.2298
(2448617.5)				5.114733	5.1811	3.6485	6.0761
A DEC.31 (0H)	Y:	-0.2847	+0.00121	+ 49.4641	+0.15076		+0.1069
				2.039731	2.1562		3.0037
DEC.31 (0H)	X:	+0.5873	-0.00339	+107.3498	+0.31990	+0.000315	+0.2326
(2448621.5)				0.472161	0.5769	2.9484	3.1289
A JAN. 4 (0H)	Y:	-0.2811	+0.00127	+ 50.0630	+0.14943		+0.1086
				3.681169	3.8573		0.0545

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DU SATELLITE 2 DE JUPITER: EUROPE N=1.7693

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	+0.0432	-0.10871	+198.5720	+0.36690	+0.095288	+0.8287
(2448257.5)				2.945967	2.4804	4.6906	5.7991
A JAN. 6 (OH)	Y:	+0.1399	-0.02464	+ 66.9637	+0.12241		+0.2708
				6.077682	1.2508		2.6355
JAN. 6 (OH)	X:	-0.4224	+0.12543	+199.9911	+0.67648	+0.064290	+0.8297
(2448262.5)				5.517261	5.9709	2.2392	4.6949
A JAN.11 (OH)	Y:	+0.0427	-0.00169	+ 66.9963	+0.14589		+0.2686
				2.366735	4.1368		1.5508
JAN.11 (OH)	X:	-0.3257	+0.14435	+202.0293	+0.57158	+0.065609	+0.8377
(2448267.5)				1.805015	3.5087	1.8517	3.6358
A JAN.16 (OH)	Y:	+0.0000	-0.00790	+ 66.8444	+0.15746		+0.2709
				4.940015	0.6640		0.4864
JAN.16 (OH)	X:	-0.0949	+0.11166	+202.7743	+0.65386	+0.058486	+0.8350
(2448272.5)				4.381847	5.0413	1.2258	2.5777
A JAN.21 (OH)	Y:	-0.0716	-0.00340	+ 66.5248	+0.18236		+0.2639
				1.230240	3.4014		5.7084
JAN.21 (OH)	X:	+0.6441	-0.13200	+203.6256	+0.98869	+0.102295	+0.8472
(2448277.5)				0.671747	1.8575	5.1880	1.4770
A JAN.26 (OH)	Y:	-0.0634	-0.02108	+ 66.0447	+0.19800		+0.2643
				3.804923	6.1701		4.6257
JAN.26 (OH)	X:	+0.6405	-0.06266	+204.7692	+0.25178	+0.050711	+0.8414
(2448282.5)				3.248869	4.6000	5.1339	0.4186
A JAN.31 (OH)	Y:	-0.1407	-0.01020	+ 65.3445	+0.21150		+0.2635
				0.095605	2.4708		3.5418
JAN.31 (OH)	X:	+0.5546	+0.04619	+204.8461	+0.50752	+0.027984	+0.8355
(2448287.5)				5.822951	0.9475	2.8923	5.6346
A FEV. 5 (OH)	Y:	-0.1947	-0.00714	+ 64.5847	+0.23515		+0.2575
				2.669618	5.1793		2.4921
FEV. 5 (OH)	X:	+0.4210	+0.15888	+204.9931	+0.65733	+0.068271	+0.8476
(2448292.5)				2.114188	4.3883	2.2643	4.5567
A FEV.10 (OH)	Y:	-0.2299	-0.01020	+ 63.6533	+0.23288		+0.2546
				5.244111	1.5785		1.4045
FEV.10 (OH)	X:	+0.8022	+0.04291	+204.1116	+0.47676	+0.028972	+0.8345
(2448297.5)				4.689635	0.0433	1.8308	3.4803
A FEV.15 (OH)	Y:	-0.2972	+0.00338	+ 62.6402	+0.25727		+0.2524
				1.533511	4.1441		0.3217
FEV.15 (OH)	X:	+0.9788	+0.02926	+203.4475	+0.57272	+0.017056	+0.8332
(2448302.5)				0.979994	3.1624	0.4737	2.4161
A FEV.20 (OH)	Y:	-0.3251	-0.00409	+ 61.5461	+0.25273		+0.2468
				4.106645	0.5302		5.5458
FEV.20 (OH)	X:	+1.1025	+0.03342	+201.9874	+0.31779	+0.034138	+0.8321
(2448307.5)				3.554301	5.5874	0.0937	1.3502
A FEV.25 (OH)	Y:	-0.3428	-0.01253	+ 60.3957	+0.24426		+0.2432
				0.395570	3.1591		4.4619
FEV.25 (OH)	X:	+1.5155	-0.07286	+200.3924	+0.77758	+0.075024	+0.8368
(2448312.5)				6.124499	1.8396	4.6708	0.2581
A MAR. 2 (OH)	Y:	-0.3489	-0.02020	+ 59.2773	+0.25458		+0.2397
				2.967003	5.8338		3.3881
MAR. 2 (OH)	X:	+1.6127	-0.06186	+198.7531	+0.31759	+0.042696	+0.8226
(2448317.5)				2.415412	5.3468	4.7637	5.4717
A MAR. 7 (OH)	Y:	-0.4279	-0.00220	+ 58.0762	+0.23721		+0.2364
				5.536514	2.1081		2.3028
MAR. 7 (OH)	X:	+1.4987	+0.03409	+196.6175	+0.46724	+0.022358	+0.8156
(2448322.5)				4.983856	1.2146	2.5086	4.3946
A MAR.12 (OH)	Y:	-0.4572	-0.00351	+ 56.9501	+0.23076		+0.2331
				1.822124	4.7295		1.2271

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
MAR.12 (OH) (2448327.5)	X:	+1.0921	+0.22653	+194.9882 1.268773	+1.08053 4.3466	+0.107341 1.7038	+0.8300 3.3143
A MAR.17 (OH)	Y:	-0.4911	-0.00112	+ 55.8309 4.390797	+0.20582 1.1385		+0.2289 0.1521
MAR.17 (OH) (2448332.5)	X:	+1.6514	+0.03890	+191.7348 3.836854	+0.42751 0.2709	+0.027482 1.2980	+0.8047 2.2178
A MAR.22 (OH)	Y:	-0.5148	+0.00064	+ 54.8005 0.673299	+0.20065 3.6797		+0.2278 5.3320
MAR.22 (OH) (2448337.5)	X:	+2.0836	-0.08928	+189.1173 0.118236	+0.64932 2.6763	+0.060157 5.1273	+0.8053 1.1331
A MAR.27 (OH)	Y:	-0.5255	-0.00763	+ 53.8319 3.238741	+0.18556 0.0571		+0.2237 4.2521
MAR.27 (OH) (2448342.5)	X:	+2.2464	-0.11622	+186.5959 2.686801	+0.57280 0.3436	+0.078194 4.9450	+0.8041 0.0616
A AVR. 1 (OH)	Y:	-0.5437	-0.00758	+ 52.9084 5.802948	+0.15758 2.7062		+0.2226 3.1756
AVR. 1 (OH) (2448347.5)	X:	+1.7762	+0.10145	+183.6122 5.248045	+0.34413 2.2513	+0.051860 2.5060	+0.7874 5.2239
A AVR. 6 (OH)	Y:	-0.5551	-0.00894	+ 52.1202 2.082885	+0.15112 5.3724		+0.2183 2.0684
AVR. 6 (OH) (2448352.5)	X:	+1.9259	+0.06617	+181.0942 1.525272	+0.75008 4.8543	+0.034186 2.0910	+0.7813 4.1469
A AVR.11 (OH)	Y:	-0.6092	+0.00290	+ 51.3799 4.644304	+0.13019 1.7435		+0.2193 0.9826
AVR.11 (OH) (2448357.5)	X:	+2.0727	+0.02476	+178.0237 4.085766	+0.50850 1.1900	+0.015734 1.4652	+0.7714 3.0635
A AVR.16 (OH)	Y:	-0.6136	-0.00173	+ 50.7517 0.921286	+0.11893 4.3880		+0.2195 6.1813
AVR.16 (OH) (2448362.5)	X:	+2.2757	-0.05341	+175.2309 0.360786	+0.63966 3.5003	+0.050050 5.6893	+0.7709 1.9512
A AVR.21 (OH)	Y:	-0.6152	-0.00712	+ 50.2014 3.481142	+0.11188 0.8707		+0.2147 5.0758
AVR.21 (OH) (2448367.5)	X:	+2.1411	+0.02101	+172.3869 2.918620	+0.53706 0.0712	+0.013220 1.1055	+0.7527 0.8579
A AVR.26 (OH)	Y:	-0.6405	-0.00057	+ 49.7296 6.038963	+0.09532 3.5430		+0.2186 3.9729
AVR.26 (OH) (2448372.5)	X:	+2.2053	+0.01138	+169.7152 5.475254	+0.57822 2.7660	+0.008402 3.4797	+0.7490 6.0486
A MAI 1 (OH)	Y:	-0.6392	-0.00610	+ 49.3615 2.313154	+0.09644 0.0161		+0.2177 2.8888
MAI 1 (OH) (2448377.5)	X:	+2.3699	-0.04693	+166.9453 1.748818	+0.61841 5.7463	+0.030962 4.1781	+0.7475 4.9584
A MAI 6 (OH)	Y:	-0.6692	+0.00324	+ 49.0432 4.869719	+0.09682 2.8418		+0.2174 1.7846
MAI 6 (OH) (2448382.5)	X:	+2.1749	+0.01900	+164.3607 4.301202	+0.50884 1.7035	+0.021940 2.1019	+0.7399 3.8349
A MAI 11 (OH)	Y:	-0.6749	+0.00453	+ 48.8356 1.141279	+0.09204 5.4213		+0.2195 0.6700
MAI 11 (OH) (2448387.5)	X:	+2.0224	+0.07320	+162.1699 0.571424	+0.83569 4.3731	+0.041829 1.6255	+0.7370 2.7457
A MAI 16 (OH)	Y:	-0.6709	-0.00042	+ 48.6641 3.695767	+0.09612 1.9234		+0.2193 5.8639
MAI 16 (OH) (2448392.5)	X:	+2.0631	+0.04413	+159.3394 3.122243	+0.47800 0.5543	+0.023202 1.4250	+0.7265 1.6460
A MAI 21 (OH)	Y:	-0.6618	-0.00285	+ 48.5618 6.249211	+0.10092 4.6491		+0.2225 4.7615

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
MAI 21 (OH)	X:	+2.5170	-0.14870	+157.1925	+0.67404	+0.081520	+0.7364
(2448397.5)				5.671315	2.6078	4.9598	0.5217
A MAI 26 (OH)	Y:	-0.6501	-0.00611	+ 48.5595	+0.11995		+0.2227
				2.519393	0.9303		3.6514
MAI 26 (OH)	X:	+2.3039	-0.08183	+154.8243	+0.56378	+0.036686	+0.7185
(2448402.5)				1.942136	6.2034	4.9712	5.7049
A MAI 31 (OH)	Y:	-0.6690	+0.00292	+ 48.5646	+0.11697		+0.2257
				5.070913	3.6330		2.5395
MAI 31 (OH)	X:	+1.9375	+0.04023	+152.7118	+0.48035	+0.026639	+0.7164
(2448407.5)				4.490461	2.3043	2.0597	4.5911
A JUN. 5 (OH)	Y:	-0.6560	+0.00233	+ 48.6464	+0.12215		+0.2277
				1.338834	6.2346		1.4424
JUN. 5 (OH)	X:	+1.6278	+0.13255	+151.3193	+1.05091	+0.084831	+0.7249
(2448412.5)				0.756706	4.7257	1.8235	3.4865
A JUN.10 (OH)	Y:	-0.6586	+0.00801	+ 48.7546	+0.14150		+0.2294
				3.890080	2.5872		0.3344
JUN.10 (OH)	X:	+2.0508	-0.06967	+149.0537	+0.67504	+0.022224	+0.7039
(2448417.5)				3.304417	1.1841	5.4242	2.3535
A JUN.15 (OH)	Y:	-0.6423	+0.00758	+ 48.9473	+0.14011		+0.2316
				0.156625	5.1341		5.4966
JUN.15 (OH)	X:	+1.9906	-0.08172	+147.1911	+0.53295	+0.037342	+0.7063
(2448422.5)				5.849637	3.3370	5.1789	1.2519
A JUN.20 (OH)	Y:	-0.6015	-0.00030	+ 49.1507	+0.14845		+0.2348
				2.706117	1.4508		4.3943
JUN.20 (OH)	X:	+1.8082	-0.04973	+145.4881	+0.59772	+0.019026	+0.7011
(2448427.5)				2.115183	0.1519	4.8454	0.1501
A JUN.25 (OH)	Y:	-0.5825	+0.00292	+ 49.3827	+0.15477		+0.2382
				5.254901	4.0673		3.2895
JUN.25 (OH)	X:	+1.4882	+0.04498	+143.8609	+0.43821	+0.040952	+0.6988
(2448432.5)				4.661341	2.7908	2.3905	5.2955
A JUN.30 (OH)	Y:	-0.5696	+0.00809	+ 49.6847	+0.16581		+0.2384
				1.520750	0.3058		2.1672
JUN.30 (OH)	X:	+1.5445	-0.02748	+142.5513	+0.56200	+0.004417	+0.6914
(2448437.5)				0.923693	5.2051	3.8551	4.1951
A JUL. 5 (OH)	Y:	-0.5382	+0.00632	+ 49.9820	+0.17079		+0.2445
				4.068737	2.9223		1.0539
JUL. 5 (OH)	X:	+1.4820	-0.06038	+141.3796	+0.65810	+0.019038	+0.6867
(2448442.5)				3.469236	1.4649	5.1295	3.0814
A JUL.10 (OH)	Y:	-0.5003	+0.00707	+ 50.3375	+0.17231		+0.2473
				0.333003	5.4726		6.2348
JUL.10 (OH)	X:	+1.2457	-0.02402	+140.2179	+0.67870	+0.022743	+0.6921
(2448447.5)				6.014614	3.9521	0.4417	1.9674
A JUL.15 (OH)	Y:	-0.4645	+0.00763	+ 50.7152	+0.18845		+0.2479
				2.881027	1.7276		5.1121
JUL.15 (OH)	X:	+1.0645	+0.00486	+139.0192	+0.49708	+0.015402	+0.6819
(2448452.5)				2.274835	0.2065	1.5703	0.8450
A JUL.20 (OH)	Y:	-0.4246	+0.00678	+ 51.1045	+0.18646		+0.2537
				5.427845	4.3386		3.9911
JUL.20 (OH)	X:	+1.0478	-0.04576	+138.1184	+0.53575	+0.016696	+0.6872
(2448457.5)				4.819376	2.7534	4.5872	6.0186
A JUL.25 (OH)	Y:	-0.3715	+0.00603	+ 51.5376	+0.19170		+0.2561
				1.691528	0.6011		2.8909
JUL.25 (OH)	X:	+1.0237	-0.09445	+137.0072	+0.54273	+0.030330	+0.6843
(2448462.5)				1.081985	5.8541	4.4555	4.9118
A JUL.30 (OH)	Y:	-0.3438	+0.01541	+ 51.9833	+0.20504		+0.2590
				4.238512	3.1647		1.7708

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		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.30 (OH)	X:	+0.5734	+0.02287	+136.3156	+0.37106	+0.037572	+0.6885
(2448467.5)				3.624838	1.9913	1.7567	3.7730
A AOU. 4 (OH)	Y:	-0.3081	+0.01967	+ 52.4922	+0.20197		+0.2630
				0.501871	5.6753		0.6547
AOU. 4 (OH)	X:	+0.3634	+0.04521	+135.9773	+0.72118	+0.035014	+0.6849
(2448472.5)				6.170607	4.4274	1.7046	2.6700
A AOU. 9 (OH)	Y:	-0.2199	+0.00632	+ 52.9685	+0.20674		+0.2663
				3.048167	1.9979		5.8230
AOU. 9 (OH)	X:	+0.3468	-0.01563	+135.3573	+0.50072	+0.004665	+0.6806
(2448477.5)				2.429514	0.6597	1.7238	1.5527
A AOU.14 (OH)	Y:	-0.1605	+0.00794	+ 53.4924	+0.20771		+0.2707
				5.594201	4.5696		4.7144
AOU.14 (OH)	X:	+0.6219	-0.18264	+135.2788	+0.60905	+0.080088	+0.6965
(2448482.5)				4.971619	2.5389	4.9610	0.4294
A AOU.19 (OH)	Y:	-0.1106	+0.01060	+ 54.0516	+0.22659		+0.2728
				1.858283	0.8022		3.5965
AOU.19 (OH)	X:	+0.1186	-0.04158	+134.6235	+0.50849	+0.007461	+0.6812
(2448487.5)				1.234713	5.9668	4.7849	5.5899
A AOU.24 (OH)	Y:	-0.0536	+0.01055	+ 54.6070	+0.21911		+0.2773
				4.404008	3.4157		2.4731
AOU.24 (OH)	X:	-0.2690	+0.04411	+134.3403	+0.37551	+0.034488	+0.6860
(2448492.5)				3.777847	2.4462	1.9536	4.4706
A AOU.29 (OH)	Y:	+0.0148	+0.01110	+ 55.2170	+0.21907		+0.2803
				0.667017	5.9556		1.3664
AOU.29 (OH)	X:	-0.4598	+0.05685	+134.6526	+0.81891	+0.055017	+0.6910
(2448497.5)				0.041537	4.7297	1.8221	3.3670
A SEP. 3 (OH)	Y:	+0.0552	+0.02038	+ 55.8167	+0.23537		+0.2831
				3.213947	2.2493		0.2527
SEP. 3 (OH)	X:	-0.2088	-0.10490	+134.5203	+0.64898	+0.035648	+0.6838
(2448502.5)				2.585048	1.2613	5.3889	2.2253
A SEP. 8 (OH)	Y:	+0.1235	+0.01642	+ 56.4840	+0.23090		+0.2850
				5.760531	4.7908		5.4152
SEP. 8 (OH)	X:	-0.4352	-0.07634	+134.8362	+0.46522	+0.031395	+0.6886
(2448507.5)				5.126918	3.3468	5.1912	1.1197
A SEP.13 (OH)	Y:	+0.2178	+0.00704	+ 57.1483	+0.23283		+0.2904
				2.023924	1.0818		4.3009
SEP.13 (OH)	X:	-0.7238	-0.02114	+135.0596	+0.53064	+0.007202	+0.6838
(2448512.5)				1.389267	6.2314	2.9057	0.0104
A SEP.18 (OH)	Y:	+0.2776	+0.01160	+ 57.8473	+0.23311		+0.2937
				4.570652	3.6557		3.1976
SEP.18 (OH)	X:	-0.9794	+0.03400	+135.3246	+0.35918	+0.042041	+0.6911
(2448517.5)				3.933709	2.8357	2.3847	5.1621
A SEP.23 (OH)	Y:	+0.3208	+0.01819	+ 58.5769	+0.24119		+0.2942
				0.835284	6.1944		2.0742
SEP.23 (OH)	X:	-0.9328	-0.04672	+135.9230	+0.45047	+0.010461	+0.6850
(2448522.5)				0.195804	5.2644	4.8969	4.0551
A SEP.28 (OH)	Y:	+0.3977	+0.01220	+ 59.3058	+0.24047		+0.3012
				3.382487	2.5307		0.9559
SEP.28 (OH)	X:	-1.0578	-0.05929	+136.6940	+0.58638	+0.018037	+0.6873
(2448527.5)				2.742317	1.4955	5.1507	2.9407
A OCT. 3 (OH)	Y:	+0.4703	+0.01114	+ 60.1058	+0.23869		+0.3041
				5.930273	5.0773		6.1369
OCT. 3 (OH)	X:	-1.3250	-0.00784	+137.4875	+0.64003	+0.023226	+0.6959
(2448532.5)				5.289106	3.9920	0.6449	1.8361
A OCT. 8 (OH)	Y:	+0.5267	+0.01176	+ 60.9049	+0.25401		+0.3044
				2.196012	1.3515		5.0188

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE JUPITER: EUROPE N=1.7693

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
OCT. 8 (OH)	X:	-1.3917	-0.01836	+138.3541	+0.48835	+0.001392	+0.6950
(2448537.5)				1.550892	0.4156	4.8114	0.7065
A OCT.13 (OH)	Y:	+0.5945	+0.00702	+ 61.7466	+0.24006		+0.3111
				4.744179	3.9684		3.9006
OCT.13 (OH)	X:	-1.4274	-0.05205	+139.5356	+0.47604	+0.022631	+0.7013
(2448542.5)				4.097655	2.7458	4.6015	5.8848
A OCT.18 (OH)	Y:	+0.6576	+0.00704	+ 62.6177	+0.24661		+0.3129
				1.010385	0.2541		2.7962
OCT.18 (OH)	X:	-1.4620	-0.08178	+140.3503	+0.49681	+0.024185	+0.6996
(2448547.5)				0.362026	5.9138	4.6084	4.7847
A OCT.23 (OH)	Y:	+0.6852	+0.01850	+ 63.5018	+0.25715		+0.3159
				3.560360	2.8517		1.6886
OCT.23 (OH)	X:	-1.9915	+0.08678	+141.7078	+0.24453	+0.064275	+0.7176
(2448552.5)				2.908413	2.5640	1.7845	3.6551
A OCT.28 (OH)	Y:	+0.7311	+0.01905	+ 64.4812	+0.24903		+0.3198
				6.111096	5.3714		0.5763
OCT.28 (OH)	X:	-2.0119	+0.05724	+143.2162	+0.69596	+0.035981	+0.7133
(2448557.5)				5.461144	4.5230	1.6430	2.5521
A NOV. 2 (OH)	Y:	+0.8102	+0.00685	+ 65.4224	+0.25098		+0.3232
				2.378637	1.7373		5.7463
NOV. 2 (OH)	X:	-1.8075	-0.05720	+144.6840	+0.59753	+0.022597	+0.7158
(2448562.5)				1.726536	0.9890	4.9272	1.4374
A NOV. 7 (OH)	Y:	+0.8613	+0.00606	+ 66.4343	+0.24734		+0.3279
				4.930234	4.3356		4.6495
NOV. 7 (OH)	X:	-1.5660	-0.17806	+146.9523	+0.54414	+0.092973	+0.7354
(2448567.5)				4.276232	2.4970	4.9351	0.3357
A NOV.12 (OH)	Y:	+0.9116	+0.00070	+ 67.4534	+0.26636		+0.3291
				1.200541	0.6038		3.5401
NOV.12 (OH)	X:	-2.1319	+0.02337	+148.2634	+0.54129	+0.017692	+0.7244
(2448572.5)				0.545127	5.9851	2.3055	5.4938
A NOV.17 (OH)	Y:	+0.9385	+0.00470	+ 68.5402	+0.24961		+0.3337
				3.753321	3.2509		2.4270
NOV.17 (OH)	X:	-2.3594	+0.08949	+149.9678	+0.37493	+0.050873	+0.7364
(2448577.5)				3.095391	3.0055	1.9869	4.3920
A NOV.22 (OH)	Y:	+0.9719	+0.00548	+ 69.6456	+0.25011		+0.3367
				0.024489	5.8475		1.3273
NOV.22 (OH)	X:	-2.3213	+0.05630	+152.0732	+0.72063	+0.042886	+0.7407
(2448582.5)				5.652272	4.9026	1.6326	3.3043
A NOV.27 (OH)	Y:	+0.9708	+0.01467	+ 70.7399	+0.26227		+0.3398
				2.579767	2.2013		0.2356
NOV.27 (OH)	X:	-1.9696	-0.10483	+154.0328	+0.73637	+0.053194	+0.7452
(2448587.5)				1.923059	1.5657	5.4049	2.1724
A DEC. 2 (OH)	Y:	+1.0182	+0.00562	+ 71.9456	+0.24954		+0.3421
				5.136438	4.7632		5.4054
DEC. 2 (OH)	X:	-2.1550	-0.03572	+156.5301	+0.44776	+0.023829	+0.7491
(2448592.5)				4.477524	3.8505	5.2921	1.0847
A DEC. 7 (OH)	Y:	+1.0582	-0.00225	+ 73.1141	+0.25611		+0.3472
				1.410569	1.1182		4.2999
DEC. 7 (OH)	X:	-2.3236	+0.03438	+158.8117	+0.51242	+0.023372	+0.7478
(2448597.5)				0.751284	0.2171	2.3320	6.2751
A DEC.12 (OH)	Y:	+1.0589	+0.00326	+ 74.3278	+0.24958		+0.3507
				3.968678	3.7734		3.2224
DEC.12 (OH)	X:	-2.2601	+0.01689	+161.2406	+0.35637	+0.032525	+0.7652
(2448602.5)				3.309196	2.9660	3.2802	5.1754
A DEC.17 (OH)	Y:	+1.0795	-0.00205	+ 75.5449	+0.25179		+0.3500
				0.245742	0.0626		2.1120

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE JUPITER: EUROPE N=1.7693

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
DEC.17 (0H)	X:	-2.2335	-0.00417	+163.5129	+0.53619	+0.004140	+0.7647
(2448607.5)				5.868641	5.7199	2.4832	4.0734
A DEC.22 (0H)	Y:	+1.0629	+0.00685	+ 76.7615	+0.25388		+0.3583
				2.806229	2.7635		1.0096
DEC.22 (0H)	X:	-2.2791	+0.01668	+166.0499	+0.48234	+0.014214	+0.7731
(2448612.5)				2.145584	2.2382	1.0545	2.9858
A DEC.27 (0H)	Y:	+1.0739	+0.00154	+ 78.0141	+0.24257		+0.3605
				5.368394	5.3843		6.2134
DEC.27 (0H)	X:	-2.3809	+0.06820	+168.4188	+0.70283	+0.040414	+0.7800
(2448617.5)				4.710050	4.4513	0.9430	1.9071
A JAN. 1 (0H)	Y:	+1.0759	-0.00567	+ 79.2130	+0.24754		+0.3582
				1.648523	1.7102		5.1180
JAN. 1 (0H)	X:	-1.9637	-0.07748	+170.8135	+0.76861	+0.054295	+0.7937
(2448622.5)				0.988894	1.2371	4.9281	0.7924
A JAN. 6 (0H)	Y:	+1.0927	-0.01290	+ 80.4543	+0.22641		+0.3670
				4.213262	4.4234		4.0241

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE JUPITER: GANYMEDE N=0.8782

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.7835	+0.09885	+317.0065	+1.03480	+0.018815	+0.4992
(2448257.5)				4.671097	5.4338	2.4851	0.2080
A JAN. 9 (OH)	Y:	+0.1026	+0.00142	+103.6442	+0.20479		+0.1633
				1.504179	3.1807		3.3658
JAN. 9 (OH)	X:	-0.5663	+0.02920	+321.8997	+0.85446	+0.020238	+0.5063
(2448265.5)				5.429366	6.2571	2.1105	1.7249
A JAN.17 (OH)	Y:	+0.0277	+0.02396	+103.4890	+0.25805		+0.1673
				2.261037	4.2992		4.8381
JAN.17 (OH)	X:	-0.2675	-0.04027	+325.2907	+0.88983	+0.008300	+0.5540
(2448273.5)				6.187804	1.1231	4.0107	3.2362
A JAN.25 (OH)	Y:	+0.0670	+0.02205	+102.5879	+0.30268		+0.1765
				3.020006	5.2616		0.0881
JAN.25 (OH)	X:	-1.2038	+0.13770	+328.0069	+0.37858	+0.045041	+0.6025
(2448281.5)				0.667460	2.1373	2.5930	4.8372
A FEV. 2 (OH)	Y:	+0.1160	+0.01963	+101.0485	+0.33688		+0.1780
				3.780024	6.1894		1.6594
FEV. 2 (OH)	X:	-0.6748	+0.03983	+327.8531	+0.63259	+0.034627	+0.5849
(2448289.5)				1.427789	2.8753	4.2614	0.1465
A FEV.10 (OH)	Y:	+0.2560	-0.01207	+ 99.0486	+0.38849		+0.1660
				4.539410	0.8286		3.2223
FEV.10 (OH)	X:	-0.5151	-0.03992	+326.6625	+0.84728	+0.025508	+0.5210
(2448297.5)				2.187517	3.9524	0.0019	1.6924
A FEV.18 (OH)	Y:	+0.2491	-0.01734	+ 96.5068	+0.41051		+0.1534
				5.298171	1.6811		4.7710
FEV.18 (OH)	X:	-0.9736	+0.11775	+324.4454	+0.93005	+0.015380	+0.4853
(2448305.5)				2.945928	5.2459	2.8876	3.1509
A FEV.26 (OH)	Y:	+0.1527	-0.00049	+ 93.6829	+0.39902		+0.1415
				6.056411	2.5571		6.2506
FEV.26 (OH)	X:	-0.5100	-0.01110	+320.3316	+0.75001	+0.020451	+0.5057
(2448313.5)				3.703996	6.0159	1.2649	4.6274
A MAR. 6 (OH)	Y:	+0.0861	+0.01410	+ 90.7718	+0.38988		+0.1381
				0.528325	3.3998		1.4653
MAR. 6 (OH)	X:	-0.7082	+0.05314	+315.2017	+0.85501	+0.021834	+0.5255
(2448321.5)				4.457829	0.6677	2.8508	6.1479
A MAR.14 (OH)	Y:	+0.1179	+0.01090	+ 87.8452	+0.36041		+0.1404
				1.280656	4.2202		2.9570
MAR.14 (OH)	X:	-0.4945	-0.01390	+309.4545	+0.89267	+0.015670	+0.5202
(2448329.5)				5.208988	1.7020	3.7919	1.3941
A MAR.22 (OH)	Y:	+0.1804	+0.00110	+ 85.0837	+0.31575		+0.1365
				2.030712	5.0720		4.5236
MAR.22 (OH)	X:	-0.2517	-0.10619	+302.9481	+1.07883	+0.023835	+0.5126
(2448337.5)				5.955466	2.6203	5.7121	2.9567
A MAR.30 (OH)	Y:	+0.2595	-0.01649	+ 82.6131	+0.27101		+0.1359
				2.777434	5.9463		6.0851
MAR.30 (OH)	X:	-1.2946	+0.16003	+296.0733	+0.84568	+0.036573	+0.4635
(2448345.5)				0.419481	3.9840	2.9527	4.5592
A AVR. 7 (OH)	Y:	+0.2062	-0.00677	+ 80.4431	+0.22781		+0.1233
				3.520053	0.4921		1.3539

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE JUPITER: GANYMEDE N=0.8782

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AVR. 7 (OH)	X:	-0.0668	-0.12122	+287.9473	+0.69279	+0.043543	+0.3956
(2448353.5)				1.157505	4.1289	5.5930	6.0489
A AVR.15 (OH)	Y:	+0.2370	-0.01946	+ 78.7112	+0.20415		+0.1124
				4.260170	1.3998		2.8317
AVR.15 (OH)	X:	-0.4508	-0.03241	+281.2264	+0.89871	+0.016088	+0.3766
(2448361.5)				1.894599	5.2453	0.4762	1.1446
A AVR.23 (OH)	Y:	+0.1253	+0.00288	+ 77.2201	+0.16038		+0.1093
				4.997690	2.4043		4.2224
AVR.23 (OH)	X:	-0.5790	+0.01270	+274.2074	+0.97971	+0.003006	+0.3881
(2448369.5)				2.628196	6.1806	2.5859	2.5750
A MAI 1 (OH)	Y:	+0.1121	+0.00911	+ 76.1477	+0.14517		+0.1100
				5.732111	3.4536		5.6699
MAI 1 (OH)	X:	-0.3096	-0.06569	+267.3930	+0.97272	+0.006471	+0.3825
(2448377.5)				3.359379	0.8049	0.1097	4.0792
A MAI 9 (OH)	Y:	+0.0991	+0.01641	+ 75.4441	+0.14876		+0.1088
				0.180669	4.4498		0.8971
MAI 9 (OH)	X:	-0.6755	+0.00778	+260.6527	+0.95297	+0.005595	+0.3695
(2448385.5)				4.086036	1.5186	3.1918	5.6336
A MAI 17 (OH)	Y:	+0.1656	+0.00804	+ 74.9836	+0.15085		+0.1065
				0.909551	5.4373		2.4349
MAI 17 (OH)	X:	-0.2330	-0.09204	+254.8804	+1.17851	+0.024421	+0.3466
(2448393.5)				4.810498	2.2881	5.4647	0.9024
A MAI 25 (OH)	Y:	+0.2082	-0.00172	+ 74.7953	+0.16914		+0.0983
				1.636800	0.1148		3.9728
MAI 25 (OH)	X:	-0.4755	-0.04415	+248.8317	+1.06937	+0.015978	+0.3115
(2448401.5)				5.533443	3.1342	0.1695	2.3890
A JUN. 2 (OH)	Y:	+0.2191	-0.00707	+ 74.8802	+0.18842		+0.0929
				2.361825	0.9794		5.4713
JUN. 2 (OH)	X:	-0.6954	+0.05079	+243.2542	+0.90211	+0.011951	+0.2638
(2448409.5)				6.254658	4.0508	3.3332	3.7749
A JUN.10 (OH)	Y:	+0.1821	-0.00363	+ 75.1839	+0.20454		+0.0858
				3.084659	1.7814		0.5887
JUN.10 (OH)	X:	-0.2623	-0.06760	+238.3226	+0.87102	+0.021426	+0.2592
(2448417.5)				0.688671	4.5744	6.2511	5.1116
A JUN.18 (OH)	Y:	+0.2081	-0.01175	+ 75.6991	+0.23136		+0.0857
				3.806524	2.5287		1.9817
JUN.18 (OH)	X:	-0.2559	-0.05686	+233.7337	+0.81372	+0.011913	+0.2767
(2448425.5)				1.406844	5.5875	5.6695	0.3427
A JUN.26 (OH)	Y:	+0.1696	-0.00121	+ 76.3014	+0.24549		+0.0918
				4.526364	3.3447		3.4285
JUN.26 (OH)	X:	-0.5246	-0.02117	+229.9798	+0.83135	+0.011987	+0.2691
(2448433.5)				2.121851	6.2617	0.8482	1.9002
A JUL. 4 (OH)	Y:	+0.1912	-0.00147	+ 77.0983	+0.26123		+0.0931
				5.245043	4.0960		4.9651
JUL. 4 (OH)	X:	-0.6790	+0.03575	+226.6603	+0.93048	+0.012046	+0.2422
(2448441.5)				2.836442	0.7065	2.9302	3.3744
A JUL.12 (OH)	Y:	+0.1641	+0.00549	+ 78.0256	+0.28678		+0.0856
				5.963420	4.8302		0.1902

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DU SATELLITE 3 DE JUPITER: GANYMEDE N=0.8782

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.12 (0H)	X:	-0.4023	-0.03148	+223.5609	+0.93018	+0.007181	+0.2162
(2448449.5)				3.551028	1.6520	6.1623	4.7973
A JUL.20 (0H)	Y:	+0.1761	+0.00110	+ 79.0416	+0.29788		+0.0770
				0.396805	5.5901		1.6647
JUL.20 (0H)	X:	-0.4501	+0.01026	+221.0225	+0.90183	+0.006348	+0.1922
(2448457.5)				4.263193	2.3366	4.7567	6.2227
A JUL.28 (0H)	Y:	+0.1711	-0.00326	+ 80.1752	+0.31347		+0.0696
				1.112992	0.0523		3.0448
JUL.28 (0H)	X:	-0.3860	-0.01468	+218.9344	+0.92676	+0.009806	+0.1735
(2448465.5)				4.975809	3.1899	0.8648	1.3086
A AOU. 5 (0H)	Y:	+0.1281	+0.00549	+ 81.4395	+0.32016		+0.0688
				1.828402	0.7744		4.4105
AOU. 5 (0H)	X:	-0.4474	+0.01874	+217.2172	+0.81562	+0.005605	+0.1914
(2448473.5)				5.687100	3.9579	3.7632	2.6413
A AOU.13 (0H)	Y:	+0.1496	+0.00176	+ 82.7681	+0.33430		+0.0755
				2.543697	1.5156		5.8117
AOU.13 (0H)	X:	-0.7056	+0.05947	+216.3006	+1.01289	+0.016776	+0.2098
(2448481.5)				0.116906	4.7376	2.0923	4.1967
A AOU.21 (0H)	Y:	+0.1627	+0.00128	+ 84.1969	+0.35051		+0.0784
				3.258927	2.2502		1.0300
AOU.21 (0H)	X:	-0.2211	-0.03990	+215.1879	+0.72591	+0.013603	+0.1828
(2448489.5)				0.826515	5.5863	5.2826	5.7277
A AOU.29 (0H)	Y:	+0.1993	-0.00632	+ 85.7470	+0.35570		+0.0752
				3.973755	2.9768		2.5205
AOU.29 (0H)	X:	-0.5284	+0.02446	+215.3764	+0.79544	+0.013911	+0.1454
(2448497.5)				1.537748	6.1195	1.4986	0.8269
A SEP. 6 (0H)	Y:	+0.1709	-0.00498	+ 87.3573	+0.36537		+0.0656
				4.688828	3.7198		3.9791
SEP. 6 (0H)	X:	-0.6136	+0.07964	+215.7080	+0.85718	+0.019747	+0.1322
(2448505.5)				2.249731	0.5723	2.8480	2.1052
A SEP.14 (0H)	Y:	+0.1191	+0.00184	+ 89.0646	+0.38402		+0.0586
				5.404710	4.4606		5.2833
SEP.14 (0H)	X:	-0.3974	+0.02923	+216.1681	+0.74536	+0.009774	+0.1414
(2448513.5)				2.961999	1.5099	2.5250	3.4756
A SEP.22 (0H)	Y:	+0.0957	+0.00396	+ 90.8879	+0.38692		+0.0592
				6.120243	5.2127		0.3049
SEP.22 (0H)	X:	-0.2285	-0.00432	+217.4794	+0.84199	+0.008911	+0.1553
(2448521.5)				3.675675	2.2868	4.6173	4.8077
A SEP.30 (0H)	Y:	+0.1340	-0.00316	+ 92.7914	+0.39019		+0.0694
				0.553210	5.9817		1.6517
SEP.30 (0H)	X:	-0.4790	+0.03784	+218.9041	+0.77269	+0.010996	+0.1747
(2448529.5)				4.389544	3.2701	2.4837	6.1965
A OCT. 8 (0H)	Y:	+0.1019	+0.00795	+ 94.8785	+0.39311		+0.0757
				1.270649	0.4261		3.1197
OCT. 8 (0H)	X:	-0.4250	+0.02961	+221.2436	+0.78210	+0.005265	+0.1739
(2448537.5)				5.104426	3.9876	3.8996	1.4700
A OCT.16 (0H)	Y:	+0.1653	-0.00463	+ 97.0074	+0.40341		+0.0754
				1.989062	1.2055		4.6628

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE JUPITER: GANYMEDE N=0.8782

		AO	A1	BO FO	B1 F1	B2 F2	CO PO
OCT.16 (OH)	X:	-0.5774	+0.06884	+223.9642	+0.94615	+0.015305	+0.1434
(2448545.5)				5.821853	4.8162	2.3575	2.9834
A OCT.24 (OH)	Y:	+0.1163	+0.00203	+ 99.2878	+0.40049		+0.0653
				2.708247	1.9851		6.0876
OCT.24 (OH)	X:	-0.2594	+0.01924	+227.2039	+0.79454	+0.008644	+0.1340
(2448553.5)				0.255228	5.6432	4.5138	4.2217
A NOV. 1 (OH)	Y:	+0.1489	-0.01038	+101.7477	+0.40546		+0.0652
				3.429813	2.7285		1.0932
NOV. 1 (OH)	X:	-0.1816	-0.00792	+231.0630	+0.76153	+0.010094	+0.1634
(2448561.5)				0.974587	0.0350	1.1901	5.4453
A NOV. 9 (OH)	Y:	+0.0642	+0.00365	+104.2430	+0.41283		+0.0739
				4.152485	3.5358		2.4012
NOV. 9 (OH)	X:	-0.3839	+0.04475	+235.4537	+0.82319	+0.017220	+0.1991
(2448569.5)				1.696417	0.7533	2.8355	0.6083
A NOV.17 (OH)	Y:	+0.0422	+0.01457	+106.9019	+0.42304		+0.0889
				4.877428	4.3269		3.8260
NOV.17 (OH)	X:	-0.3697	+0.03089	+240.0932	+0.75535	+0.014265	+0.2105
(2448577.5)				2.419915	1.6504	3.1086	2.1008
A NOV.25 (OH)	Y:	+0.0796	+0.01155	+109.7322	+0.41729		+0.0986
				5.604230	5.1298		5.3199
NOV.25 (OH)	X:	-0.2275	-0.01800	+245.2089	+0.85365	+0.009670	+0.2215
(2448585.5)				3.147054	2.5275	4.8196	3.6411
A DEC. 3 (OH)	Y:	+0.1770	-0.00476	+112.6380	+0.41092		+0.1057
				0.049849	5.9725		0.5679
DEC. 3 (OH)	X:	-0.1538	-0.02737	+250.9933	+0.79874	+0.015623	+0.2139
(2448593.5)				3.876374	3.2885	5.0673	5.1524
A DEC.11 (OH)	Y:	+0.1925	-0.01119	+115.6591	+0.41286		+0.1034
				0.782122	0.5050		2.0182
DEC.11 (OH)	X:	-0.3167	+0.00532	+256.7175	+0.87369	+0.010795	+0.2099
(2448601.5)				4.608828	4.2563	0.3836	0.2255
A DEC.19 (OH)	Y:	+0.1874	-0.01742	+118.7449	+0.41247		+0.1025
				1.517080	1.3575		3.4313
DEC.19 (OH)	X:	-0.4503	+0.06722	+262.7989	+0.93381	+0.014412	+0.2432
(2448609.5)				5.344457	5.2675	2.9472	1.5064
A DEC.27 (OH)	Y:	+0.0749	+0.00375	+121.9286	+0.38833		+0.1143
				2.254591	2.2290		4.7328
DEC.27 (OH)	X:	+0.4317	-0.17103	+269.5574	+0.54732	+0.039208	+0.3060
(2448617.5)				6.081085	0.1410	6.0311	2.9985
A JAN. 4 (OH)	Y:	+0.1142	-0.00162	+125.0508	+0.37734		+0.1337
				2.996462	3.0584		6.2182

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO N=0.3765

		A0	A1	B0 F0	B1 F1	C0 P0
JAN. 1 (OH)	X:	- 2.8122	+ 1.64880	+549.4701	+ 2.75485	+2.9880
(2448257.5)				5.439707	0.0322	0.9385
A JAN. 9 (OH)	Y:	+ 0.8301	- 0.55115	+179.6240	+ 0.74453	+0.9588
				2.283559	3.5997	4.0812
JAN. 9 (OH)	X:	+ 8.3849	- 0.91881	+560.6587	+ 2.13920	+3.0239
(2448265.5)				2.185736	3.0591	0.8488
A JAN.17 (OH)	Y:	- 2.6654	+ 0.31694	+180.3412	+ 0.53831	+0.9763
				5.312864	0.5713	3.9997
JAN.17 (OH)	X:	+14.6993	- 2.88661	+586.2342	+ 0.75017	+2.0554
(2448273.5)				5.218543	3.2451	0.6405
A JAN.25 (OH)	Y:	- 4.7946	+ 0.92496	+185.3090	+ 0.63216	+0.6338
				2.062311	5.5952	3.7901
JAN.25 (OH)	X:	-11.1862	+ 3.34751	+593.2977	+ 1.46061	+3.9029
(2448281.5)				1.965212	5.7652	0.2114
A FEV. 2 (OH)	Y:	+ 3.4788	- 1.02868	+183.5152	+ 0.88550	+1.1936
				5.091746	2.3126	3.3637
FEV. 2 (OH)	X:	- 4.9346	+ 2.71955	+565.5539	+ 3.43492	+3.3160
(2448289.5)				4.977090	0.3732	0.1911
A FEV.10 (OH)	Y:	+ 1.2548	- 0.77150	+171.5005	+ 1.13885	+0.9912
				1.818828	3.9755	3.3335
FEV.10 (OH)	X:	+14.1292	- 2.51772	+563.4059	+ 3.07312	+2.4267
(2448297.5)				1.726032	3.4292	6.1222
A FEV.18 (OH)	Y:	- 3.8318	+ 0.66134	+167.1181	+ 0.96756	+0.7092
				4.850625	0.7708	2.9940
FEV.18 (OH)	X:	+ 7.5281	- 0.72202	+573.7490	+ 1.11918	+2.4798
(2448305.5)				4.769126	1.1494	5.8413
A FEV.26 (OH)	Y:	- 2.5624	+ 0.29828	+166.6034	+ 0.69550	+0.7096
				1.609278	4.6999	2.6979
FEV.26 (OH)	X:	- 3.2369	+ 1.25620	+570.8248	+ 1.63601	+3.3120
(2448313.5)				1.514658	4.7709	5.6594
A MAR. 6 (OH)	Y:	+ 1.2923	- 0.43940	+162.4208	+ 0.78183	+0.9244
				4.637049	1.7115	2.5112
MAR. 6 (OH)	X:	- 8.7887	+ 3.82469	+545.1863	+ 4.20756	+2.9520
(2448321.5)				4.503459	0.5070	5.7178
A MAR.14 (OH)	Y:	+ 2.0962	- 0.98539	+152.7503	+ 1.27193	+0.8239
				1.340632	3.8338	2.5708
MAR.14 (OH)	X:	+23.4216	- 4.86629	+530.6907	+ 4.64329	+2.4237
(2448329.5)				1.231775	3.4767	4.7332
A MAR.22 (OH)	Y:	- 5.9262	+ 1.22964	+146.8985	+ 1.27255	+0.6638
				4.351989	0.4581	1.5692
MAR.22 (OH)	X:	+ 0.1011	+ 0.95630	+530.2159	+ 2.03937	+2.6235
(2448337.5)				4.279665	0.7351	4.9891
A MAR.30 (OH)	Y:	- 0.4970	- 0.16278	+145.4880	+ 0.55782	+0.7178
				1.115784	4.0444	1.8272
MAR.30 (OH)	X:	+ 4.4297	- 0.45021	+521.0448	+ 2.04797	+2.5427
(2448345.5)				1.014658	4.1903	4.6324
A AVR. 7 (OH)	Y:	- 0.8467	+ 0.06502	+142.4266	+ 0.51410	+0.6914
				4.132354	1.1540	1.4517

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO N=0.3765

		A0	A1	B0 F0	B1 F1	C0 P0
AVR. 7 (OH)	X:	-10.8120	+ 3.95178	+505.4497	+ 4.20934	+1.9568
(2448353.5)				3.989526	0.4841	4.7721
A AVR.15 (OH)	Y:	+ 2.6987	- 1.03985	+138.5398	+ 1.02017	+0.5336
				0.823422	3.6105	1.6081
AVR.15 (OH)	X:	+23.2735	- 4.73227	+492.5536	+ 4.53954	+2.9749
(2448361.5)				0.702538	3.4684	3.7612
A AVR.23 (OH)	Y:	- 6.1031	+ 1.25463	+135.9422	+ 1.05178	+0.8269
				3.820191	0.2649	0.5850
AVR.23 (OH)	X:	- 1.2679	+ 0.84145	+480.5937	+ 1.83903	+2.3214
(2448369.5)				3.744648	0.6082	3.9875
A MAI 1 (OH)	Y:	+ 0.0337	- 0.18289	+134.0554	+ 0.23916	+0.6529
				0.580291	3.8701	0.8066
MAI 1 (OH)	X:	+ 0.7099	+ 0.51381	+469.8676	+ 1.60810	+1.9258
(2448377.5)				0.479208	4.4275	3.5789
A MAI 9 (OH)	Y:	- 0.0717	- 0.15373	+133.0432	+ 0.32350	+0.5511
				3.597190	2.0139	0.3828
MAI 9 (OH)	X:	- 8.8000	+ 3.09381	+464.4266	+ 3.62354	+1.4355
(2448385.5)				3.438022	0.4437	3.3014
A MAI 17 (OH)	Y:	+ 2.5173	- 0.91134	+134.1792	+ 0.71882	+0.4166
				0.274358	3.6341	0.1013
MAI 17 (OH)	X:	+14.9949	- 2.81069	+453.6564	+ 3.33073	+2.5482
(2448393.5)				0.152297	3.5235	2.9680
A MAI 25 (OH)	Y:	- 4.3526	+ 0.82002	+133.8114	+ 0.60034	+0.7577
				3.273807	0.4659	6.0692
MAI 25 (OH)	X:	+ 2.3454	- 0.10890	+436.0094	+ 1.36934	+1.9410
(2448401.5)				3.171412	0.6862	2.8343
A JUN. 2 (OH)	Y:	- 0.7289	+ 0.02312	+131.7045	+ 0.24999	+0.5942
				0.011855	5.0318	5.9322
JUN. 2 (OH)	X:	- 3.2683	+ 1.31526	+423.0601	+ 1.27459	+1.5444
(2448409.5)				6.177366	4.6019	2.1985
A JUN.10 (OH)	Y:	+ 1.0283	- 0.40908	+130.9751	+ 0.56191	+0.4889
				3.019649	2.3255	5.2895
JUN.10 (OH)	X:	- 4.8416	+ 2.14573	+428.6434	+ 3.15879	+1.9610
(2448417.5)				2.857255	0.4518	1.8676
A JUN.18 (OH)	Y:	+ 1.7854	- 0.74667	+136.5724	+ 0.74670	+0.6402
				5.985032	3.9362	4.9637
JUN.18 (OH)	X:	+13.8212	- 2.75866	+423.9566	+ 3.51813	+2.0379
(2448425.5)				5.840215	3.4090	2.0875
A JUN.26 (OH)	Y:	- 4.5168	+ 0.89204	+138.4352	+ 0.81245	+0.6667
				2.688328	0.5816	5.1887
JUN.26 (OH)	X:	+ 5.3868	- 0.83384	+400.4247	+ 0.96611	+1.7379
(2448433.5)				2.559418	0.6414	1.6655
A JUL. 4 (OH)	Y:	- 1.6388	+ 0.24767	+134.5054	+ 0.41599	+0.5932
				5.693161	4.9731	4.7686
JUL. 4 (OH)	X:	- 0.4435	+ 0.42928	+395.8587	+ 1.42268	+1.6468
(2448441.5)				5.546574	3.7960	1.1035
A JUL.12 (OH)	Y:	+ 0.1808	- 0.16609	+136.3293	+ 0.56468	+0.5786
				2.400463	1.5433	4.2062

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO N=0.3765

		A0	A1	B0 F0	B1 F1	C0 P0
JUL.12 (OH)	X:	- 5.2063	+ 2.05435	+403.3923	+ 3.11102	+2.2084
(2448449.5)				2.245067	0.2552	0.8195
A JUL.20 (OH)	Y:	+ 2.0591	- 0.76354	+142.9263	+ 0.97737	+0.7991
				5.385206	3.7774	3.9408
JUL.20 (OH)	X:	+14.4763	- 3.03714	+404.1870	+ 3.83554	+1.1569
(2448457.5)				5.230333	3.2345	0.9762
A JUL.28 (OH)	Y:	- 5.2573	+ 1.08919	+146.6349	+ 1.22028	+0.4223
				2.090423	0.4045	4.0731
JUL.28 (OH)	X:	+ 3.9784	- 0.77617	+382.2473	+ 0.98901	+1.5683
(2448465.5)				1.916745	6.1178	0.2095
A AOU. 5 (OH)	Y:	- 1.4342	+ 0.29868	+142.1850	+ 0.33613	+0.5934
				5.063072	4.2038	3.3354
AOU. 5 (OH)	X:	- 2.4402	+ 0.95388	+377.4968	+ 0.82912	+1.9254
(2448473.5)				4.899260	3.2129	0.0094
A AOU.13 (OH)	Y:	+ 1.0196	- 0.39817	+143.5746	+ 0.44310	+0.7476
				1.765750	1.2036	3.1358
AOU.13 (OH)	X:	- 6.1824	+ 1.97573	+388.2421	+ 2.98257	+2.2010
(2448481.5)				1.618223	6.2820	6.0941
A AOU.21 (OH)	Y:	+ 2.3372	- 0.73818	+151.1158	+ 1.12876	+0.8633
				4.770571	3.4754	2.9465
AOU.21 (OH)	X:	+ 9.3514	- 1.63739	+386.3866	+ 2.78546	+1.2146
(2448489.5)				4.597054	2.9379	5.6842
A AOU.29 (OH)	Y:	- 3.7183	+ 0.63995	+153.5848	+ 1.07997	+0.4919
				1.470259	0.1488	2.5301
AOU.29 (OH)	X:	+ 7.3227	- 1.76863	+375.2122	+ 0.79796	+1.7419
(2448497.5)				1.259446	4.8736	5.1250
A SEP. 6 (OH)	Y:	- 3.1284	+ 0.76304	+151.9724	+ 0.06003	+0.7148
				4.418392	3.5801	1.9836
SEP. 6 (OH)	X:	- 8.7086	+ 2.52789	+373.9775	+ 0.85771	+1.9305
(2448505.5)				4.230219	0.9337	5.4387
A SEP.14 (OH)	Y:	+ 3.7258	- 1.08808	+154.1422	+ 0.16072	+0.8094
				1.109676	2.8265	2.3037
SEP.14 (OH)	X:	- 0.3849	+ 0.45362	+380.6208	+ 1.71277	+1.7003
(2448513.5)				0.965861	5.9926	4.8362
A SEP.22 (OH)	Y:	- 0.1503	- 0.12267	+159.6638	+ 0.76174	+0.7219
				4.130652	3.2624	1.6950
SEP.22 (OH)	X:	+ 3.7533	- 0.36968	+384.4624	+ 1.87483	+1.5846
(2448521.5)				3.948172	2.5394	4.4521
A SEP.30 (OH)	Y:	- 1.6214	+ 0.15329	+163.7957	+ 0.83276	+0.6842
				0.835115	6.0614	1.3233
SEP.30 (OH)	X:	+13.1279	- 3.18468	+387.2741	+ 1.59356	+2.3981
(2448529.5)				0.600640	3.8958	3.9648
A OCT. 8 (OH)	Y:	- 5.8930	+ 1.41341	+167.0671	+ 0.43558	+1.0432
				3.772875	0.5887	0.8416
OCT. 8 (OH)	X:	-12.2734	+ 3.12859	+392.2962	+ 1.50395	+1.4407
(2448537.5)				3.584968	0.6154	4.3892
A OCT.16 (OH)	Y:	+ 5.5348	- 1.42458	+171.3281	+ 0.43515	+0.6371
				0.476890	3.5977	1.2825

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO N=0.3765

		A0	A1	B0 F0	B1 F1	C0 P0
OCT.16 (0H) (2448545.5)	X:	+ 1.4960	+ 0.03431	+393.0053 0.326785	+ 1.31500 5.7471	+1.7390 3.5116
A OCT.24 (0H)	Y:	- 1.0814	+ 0.05494	+173.7743 3.504793	+ 0.64448 2.9446	+0.7846 0.3963
OCT.24 (0H) (2448553.5)	X:	+ 3.1985	- 0.49967	+399.1544 3.322313	+ 1.82222 2.4508	+2.0026 3.3315
A NOV. 1 (0H)	Y:	- 1.5076	+ 0.23259	+178.1134 0.222753	+ 0.90970 5.8451	+0.9039 0.2215
NOV. 1 (0H) (2448561.5)	X:	+11.3124	- 2.79603	+415.4864 6.277490	+ 1.65152 4.0329	+2.5192 3.0893
A NOV. 9 (0H)	Y:	- 5.2552	+ 1.26401	+186.7203 3.179410	+ 0.55066 1.0098	+1.1419 6.2631
NOV. 9 (0H) (2448569.5)	X:	-11.4247	+ 2.73568	+423.6349 2.985726	+ 1.48239 0.7262	+1.3769 2.7432
A NOV.17 (0H)	Y:	+ 5.3089	- 1.28928	+191.8754 6.173192	+ 0.52066 3.9287	+0.6199 5.9338
NOV.17 (0H) (2448577.5)	X:	- 3.1676	+ 0.99856	+417.5151 6.009248	+ 1.96034 5.7725	+1.9576 2.2989
A NOV.25 (0H)	Y:	+ 1.0647	- 0.40948	+190.4923 2.917727	+ 0.96808 2.7665	+0.9009 5.4986
NOV.25 (0H) (2448585.5)	X:	+ 4.3963	- 0.76282	+427.9036 2.723492	+ 2.05323 2.3782	+2.3657 2.3124
A DEC. 3 (0H)	Y:	- 2.2570	+ 0.40131	+195.7656 5.919434	+ 1.03969 5.6879	+1.0948 5.5094
DEC. 3 (0H) (2448593.5)	X:	+ 8.3216	- 2.36038	+452.4394 5.710155	+ 1.88234 4.2637	+2.1204 2.1639
A DEC.11 (0H)	Y:	- 3.7195	+ 1.01603	+207.5739 2.623764	+ 0.74917 1.3047	+0.9823 5.3481
DEC.11 (0H) (2448601.5)	X:	-13.1278	+ 3.30582	+468.5010 2.426113	+ 2.10104 0.6780	+2.2843 1.3506
A DEC.19 (0H)	Y:	+ 6.0363	- 1.54286	+215.9370 5.624104	+ 0.86641 3.8497	+1.0436 4.5413
DEC.19 (0H) (2448609.5)	X:	- 3.3956	+ 0.82980	+458.2310 5.438039	+ 1.94588 5.6081	+2.4186 1.2813
A DEC.27 (0H)	Y:	+ 1.4082	- 0.39982	+211.5591 2.357466	+ 0.94661 2.5917	+1.1173 4.4836
DEC.27 (0H) (2448617.5)	X:	+ 2.8216	- 0.16796	+472.1210 2.167966	+ 1.97574 2.0970	+2.6702 1.2163
A JAN. 4 (0H)	Y:	- 1.8099	+ 0.18910	+217.7616 5.372218	+ 0.94564 5.4246	+1.2314 4.4299

PHÉNOMÈNES DES SATELLITES GALILÉENS

DESCRIPTION :

Les satellites Galiléens, dont les orbites sont faiblement inclinées sur l'équateur et sur l'écliptique, présentent de nombreux phénomènes. Au cours de chaque révolution, les trois premiers satellites, et en général le quatrième satellite, traversent le cône de visibilité et le cône d'ombre qui s'appuient sur la planète. On peut alors observer les passages des satellites devant Jupiter et les occultations par Jupiter lors de la traversée du cône de visibilité, ou les éclipses ou les passages d'ombre sur la planète lors de la traversée du cône d'ombre. Au cours d'une année, environ 3 000 tels événements (passages début ou fin, éclipses début ou fin, occultations début ou fin, passages d'ombres début ou fin) sont calculables (mais environ 2 200 seulement sont observables). Nous donnons ici une représentation compacte de ces prédictions utilisant un développement polynômial.

MÉTHODE DE CALCUL :

Les tables des pages 53 et 54 permettent de calculer les dates en TDT des phénomènes des satellites Galiléens de la manière suivante.

Soit P la période synodique moyenne d'un satellite ; la date approchée $T1$ du phénomène proche de la date T est donnée par la relation :

$$T1 = K \times P + \tau/24 + T0 \qquad (2)$$

où K représente la partie entière de la quantité $(T - T0)/P$ et où τ est donné, sur l'intervalle $T0$, $T0 + DT$ par un polynôme de la forme :

$$\tau = C0 + C1\,x + C2\,x^2 + \ldots\ldots + Cn\,x^n \qquad (3)$$

avec $$x = \{2(T - T0)/DT\} - 1 \qquad (4)$$

$T1$ ayant été obtenu par la relation (2), on peut réitérer le calcul en substituant $T1$ à T dans la formule (4) pour obtenir une date $T2$ plus proche du phénomène recherché que $T1$. La précision de ce type de prédiction est meilleure que 60 secondes de temps.

Les tables donnent les coefficients Ci de la formule (3), numérotés de $C0$ à $C7$ pour les quatre satellites et pour les phénomènes :

— débuts et fins des éclipses des satellites par Jupiter (notées respectivement EC.D et EC.F),
— débuts et fins des occultations des satellites par Jupiter (notées OC.D et OC.F),
— débuts et fins des passages de l'ombre des satellites sur le disque de Jupiter (OM.D et OM.F),
— débuts et fins des passages des satellites devant la planète (PA.D et PA.F).

EXEMPLE D'UTILISATION :

Déterminons les dates des phénomènes du satellite I (Io) au voisinage du 30 juin 1991.

PHENOMENA OF THE GALILEAN SATELLITES

DESCRIPTION :

The Galilean satellites which orbits have low inclinations over the equator and the ecliptic, display many phenomena. During each revolution, the first three satellites and, often the fourth one, pass through the visibility and shadow cones which are tangent to the planet. It is then possible to observe the transits of the satellites across Jupiter and their occultations by Jupiter when they pass through the visibility cone, or the eclipses and the shadow transits when the shadow cone is involved. In the course of a year 3 000 such events may be computed (transits ingress and egress, eclipses disappearance and reappearance, occultations disappearance and reappearance, transits of the shadow ingress and egress). Only about 2 200 are observable. A compact representation of these predictions using a polynomial approximation is given here.

COMPUTATIONAL METHOD :

The tables on p. 53 and 54 permit the computation of the dates in TDT of phenomena of the satellites of Jupiter in the following way.

Let P be the mean synodic period of a satellite ; the approximate date $T1$ of a phenomenon close to a date T is given by :

$$T1 = K \times P + \tau/24 + T0 \qquad (2)$$

where K is the integer part of $(T - T0)/P$ and where τ is given (on the interval $T0$, $T0 + DT$) by a polynomial :

$$\tau = C0 + C1\,x + C2\,x^2 + \ldots\ldots + Cn\,x^n \qquad (3)$$

with $$x = \{2(T - T0)/DT\} - 1 \qquad (4)$$

The value $T1$ deduced from equation (2) is then substituted in place of T in equation (4). The new iteration yields a date $T2$ closer to the date of the phenomenon than $T1$. The precision of this type of prediction is better than 60 seconds of time. The tables give the coefficients Ci in formula (3), numbered from $C0$ to $C7$, for the four satellites and for the following phenomena :

— disappearance and reappearance of the satellites eclipsed by Jupiter (denoted respectively by EC.D and EC.F),
— disappearance and reappearance of the satellites occulted by Jupiter (denoted OC.D and OC.F),
— ingress and egress of the transits of the satellites shadow across the disc of Jupiter (OM.D and OM.F),
— ingress and egress of the satellites transits across the planet (PA.D and PA.F).

EXAMPLE :

Let us find the dates of the phenomena of satellite I (Io) which takes place near the 30 th of June 1991.

Voyons tout d'abord le calcul pour le début d'occultation pour lequel les tables donnent :

$T0 = 0$; $P = 1{,}769\,860\,5$; $DT = 366$

Du 0 janvier au 30 juin 1991, 181 jours se sont écoulés, on a donc :

$T = 181$ et la formule (4) donne alors :

$x = 2\,(181 - 0)/366 - 1 = -0.010\,928\,962$

La formule (3) donne ensuite :

$$\tau = 4.579\,835 + 0.039\,945\,x - 0.550\,316\,x^2 - 0.083\,764\,x^3 + 0.261\,167\,x^4 - 0.058\,048\,x^5 + 0.027\,084\,x^6 - 0.005\,987\,x^7 - 0.033\,191\,x^8 + 0.029\,383\,x^9$$

d'où = 4.579 333

On a d'autre part :

K = partie entière de $(181 - 0)/1{,}769\,860\,5 = 102$

La formule (2) donne alors : 4.579 333

$T1 = 102 \times 1{,}769\,860\,5 + 4.579\,333/24 + 0$

$T1$ = 180.716 577 jours depuis le 0 janvier (début de l'intervalle pour les occultations) soit EC.D le 29 juin 1991 à 17 h 11 m 52 s TDT. Le calcul réitéré donne $T2$ = 180.716 573 jours soit le 29 juin 1991 à 17 h 11 m 52 s TDT.

On trouverait de même pour les autres phénomènes :

EC.F le 29 juin à 19 h 29 m 30 s
OC.D le 29 juin à 16 h 25 m 59 s
OC.F le 29 juin à 18 h 43 m 45 s
PA.D le 30 juin à 13 h 35 m 54 s
PA.F le 30 juin à 15 h 53 m 49 s
OM.D le 30 juin à 14 h 21 m 07 s
OM.F le 30 juin à 16 h 38 m 58 s

IMPORTANT : Conditions d'existence des phénomènes

Le recouvrement des cônes d'ombre et de visibilité, rend inexistants certains phénomènes. Ainsi, avant (ou après) l'opposition de Jupiter, les fins (respectivement débuts) d'éclipses et les débuts (respectivement fins) d'occultations sont inobservables. Ceci ne pouvant être pris en compte dans la représentation, il est nécessaire que l'utilisateur vérifie les conditions d'existence pour les éclipses et les occultations en calculant les quatre phases EC.D, EC.F, OC.D et OC.F. Ainsi, dans l'exemple précédent, on a dans l'ordre chronologique :

OC.D le 29 juin à 16 h 25 m 59 s observable
EC.D le 29 juin à 17 h 11 m 52 s inobservable car déjà occulté
OC.F le 29 juin à 18 h 43 m 45 s inobservable car toujours éclipsé
EC.F le 29 juin à 19 h 29 m 30 s observable.

D'autre part, les caractéristiques de l'orbite du satellite IV (Callisto) font qu'il n'existe pas toujours de phénomènes. Les coefficients relatifs à ce satellite ne sont donc donnés que sur l'intervalle où ils existent.

Let us start with the computation of the disappearance for the occultation of the satellite for which the tables give :

$T0 = 0$; $P = 1.769\,860\,5$; $DT = 366$

Between January 0 to June the 30 th 1991, 181 days have elapsed

$T = 181$ *and formula (4) gives :*

$x = 2\,(181 - 0)/366 - 1 = -0.010\,928\,962$

Formula (3) then gives :

$$\tau = 4.579\,835 + 0.039\,945\,x - 0.550\,316\,x^2 - 0.083\,764\,x^3 + 0.261\,167\,x^4 - 0.058\,048\,x^5 + 0.027\,084\,x^6 - 0.005\,987\,x^7 - 0.033\,191\,x^8 + 0.029\,383\,x^9$$

therefore = 4.579 333

On the other hand,

K = *integer part of* $(181 - 0)/1.769\,860\,5 = 102$

Formula (2) then gives : 4.579 333

$T1 = 102 \times 1.769\,860\,5 + 4.579\,333/24 + 0$

$T1$ = 180.716 577 days from January 0 (beginning of the interval for the occultations) that is June the 29th 1991 at 17 h 11 m 52 s TDT. Another iteration gives $T2$ = 180.716 573 days that is June the 29th 1991 at 17 h 11 m 52 s TDT.

One would find as well for the other phenomena :

EC.F June the 29th at 19 h 29 m 30 s
OC.D June the 29th at 16 h 25 m 59 s
OC.F June the 29th at 18 h 43 m 45 s
PA.D June the 30th at 13 h 35 m 54 s
PA.F June the 30th at 15 h 53 m 49 s
OM.D June the 30th at 14 h 21 m 07 s
OM.F June the 30th at 16 h 38 m 58 s

IMPORTANT : Conditions for the existence of the phenomena

As the visibility and shadow cones may sometimes overlap, some of the computed phenomena may not exist. Thus, before (or after) the opposition of Jupiter, the reappearances (respectively the disappearances) for the eclipses, and the disappearances (respectively reappearances) for the occultations are not observable. This could not be taken into account in the representation ; so the user will have to check the existence conditions of the eclipses and occultations by computing the four steps EC.D, EC.F, OC.D and OC.F For instance, in the example above one has, in chronological order :

OC.D June 29th at 16 h 25 m59 s observable
EC.D June 29th at 17 h 11 m52 s unobservable as occulted
OC.F June 29th at 18 h 43 m45 s unobservable as already eclipsed
EC.F June 29th at 19 h 29 m30 s observable.

Moreover, the orbit of satellite IV (Callisto) is such that phenomena are not always present. The coefficients for this satellite are given on the interval for which they exist.

AN 1991 SATELLITE 1 P = 1.7698605 JOURS TO = 0.0 DT = 366.JOURS

	EC.D		EC.F		OM.D		OM.F
0	4.579835	0	6.873433	0	25.735131	0	28.033160
1	0.039945	1	0.017866	1	0.233682	1	0.295032
2	-0.550316	2	-0.535506	2	-0.282331	2	-0.365209
3	-0.083764	3	-0.060659	3	-0.267094	3	-0.471964
4	0.261167	4	0.243956	4	0.249386	4	0.425116
5	-0.058048	5	-0.069151	5	0.005027	5	0.128710
6	0.027084	6	0.038510	6	-0.160218	6	-0.350761
7	-0.005987	7	-0.006744	7	-0.046482	7	0.031621
8	-0.033191	8	-0.038211	8	0.063618	8	0.135712
9	0.029383	9	0.032493	9	0.038885	9	-0.025739

	OC.D		OC.F		PA.D		PA.F
0	3.847227	0	6.141832	0	25.001222	0	27.299140
1	2.598984	1	2.581449	1	2.747980	1	2.824009
2	1.167615	2	1.173855	2	1.640083	2	1.542784
3	-2.614766	3	-2.615630	3	-2.705698	3	-2.979331
4	1.669379	4	1.649265	4	0.945634	4	1.130444
5	-1.120638	5	-1.120253	5	-1.128413	5	-0.934697
6	-1.845571	6	-1.827923	6	-1.248276	6	-1.440314
7	1.850565	7	1.844663	7	1.802295	7	1.846740
8	0.356208	8	0.349988	8	0.157423	8	0.229428
9	-0.572152	9	-0.565567	9	-0.533871	9	-0.591122

TO = 0 CORRESPOND AU 0 JANVIER 1991 à 0 H SOIT LA DATE JULIENNE 2448256.5

AN 1991 SATELLITE 2 P = 3.5540942 JOURS TO = 0.0 DT = 366.JOURS

	EC.D		EC.F		OM.D		OM.F
0	66.455954	0	69.362781	0	24.166056	0	27.020687
1	0.511199	1	0.514363	1	-0.400189	1	-0.423703
2	0.275067	2	0.158917	2	-0.996864	2	-1.030134
3	-0.679059	3	-0.698206	3	0.329140	3	0.181346
4	-0.322893	4	-0.221335	4	0.590085	4	0.763916
5	0.054103	5	0.015047	5	-0.084213	5	-0.047572
6	0.304771	6	0.209349	6	-0.138159	6	-0.378687
7	0.072929	7	0.117482	7	-0.164759	7	0.044714
8	-0.122375	8	-0.082483	8	0.015783	8	0.111054
9	-0.011368	9	-0.026013	9	0.096176	9	-0.028510

	OC.D		OC.F		PA.D		PA.F
0	64.955344	0	67.868565	0	22.709811	0	25.575390
1	5.651855	1	5.692538	1	4.671986	1	4.661861
2	4.205715	2	4.012539	2	2.389108	2	2.279535
3	-5.840558	3	-6.043297	3	-4.528007	3	-4.766567
4	1.459194	4	1.597328	4	3.281402	4	3.504916
5	-1.756302	5	-1.739038	5	-2.528168	5	-2.467520
6	-2.687055	6	-2.785093	6	-3.465853	6	-3.738788
7	3.444104	7	3.607263	7	3.740267	7	3.971216
8	0.467488	8	0.510361	8	0.556067	8	0.669394
9	-1.089549	9	-1.175881	9	-1.135471	9	-1.267715

TO = 0 CORRESPOND AU 0 JANVIER 1991 à 0 H SOIT LA DATE JULIENNE 2448256.5

AN 1991 SATELLITE 3 P = 7.1663872 JOURS TO = 0.0 DT = 366.JOURS

	EC.D		EC.F		OM.D		OM.F
0	63.684860	0	67.344465	0	149.517112	0	153.154485
1	-0.198260	1	-0.216282	1	-0.095535	1	-0.019517
2	-0.545037	2	-0.622123	2	-0.349795	2	-0.506516
3	-0.048863	3	0.011052	3	-0.269668	3	-0.565284
4	0.302565	4	0.328638	4	0.260312	4	0.500614
5	-0.451288	5	-0.584113	5	0.367922	5	0.539080
6	-0.026080	6	-0.069082	6	-0.164884	6	-0.439465
7	0.646936	7	0.769343	7	-0.747294	7	-0.588249
8	-0.028345	8	-0.008457	8	0.077777	8	0.183373
9	-0.299440	9	-0.337641	9	0.416780	9	0.294152

	OC.D		OC.F		PA.D		PA.F
0	60.707001	0	64.354857	0	146.552505	0	150.178448
1	10.152600	1	10.235090	1	10.146149	1	10.328362
2	6.651611	2	6.533671	2	7.028130	2	6.832249
3	-10.310387	3	-10.631581	3	-10.231995	3	-10.924813
4	5.508083	4	5.560910	4	4.576866	4	4.824164
5	-4.461336	5	-4.411058	5	-4.172702	5	-3.767287
6	-7.269888	6	-7.373912	6	-6.272147	6	-6.567714
7	7.750170	7	7.912140	7	6.902418	7	7.033532
8	1.476078	8	1.539498	8	1.109478	8	1.236275
9	-2.560395	9	-2.631665	9	-2.056062	9	-2.182833

TO = 0 CORRESPOND AU 0 JANVIER 1991 à 0 H SOIT LA DATE JULIENNE 2448256.5

AN 1991 SATELLITE 4 P = 16.7535520 JOURS TO = 0.0 DT = 366.JOURS

	EC.D		EC.F		OM.D		OM.F
0	68.385724	0	73.252325	0	270.300035	0	275.065949
1	-0.357150	1	-0.559479	1	-0.777534	1	-0.881382
2	-0.386221	2	-0.720001	2	-0.425743	2	-0.851900
3	-0.217512	3	-0.220505	3	-0.146060	3	-0.500582
4	0.182831	4	0.188777	4	0.413760	4	0.768501
5	0.040648	5	0.050666	5	0.096857	5	0.267249
6	0.045558	6	0.027011	6	-0.304967	6	-0.724905
7	-0.067909	7	-0.082898	7	-0.259872	7	-0.013363
8	-0.028729	8	-0.019333	8	0.119870	8	0.281615
9	0.050074	9	0.057512	9	0.132038	9	-0.037792

	OC.D		OC.F		PA.D		PA.F
0	61.311126	0	66.201926	0	263.416851	0	268.212565
1	24.033177	1	24.169593	1	22.950203	1	23.163646
2	17.014722	2	16.253914	2	16.484418	2	15.639835
3	-23.974773	3	-25.466819	3	-23.218603	3	-25.016388
4	11.921906	4	12.128488	4	11.456544	4	11.979636
5	-10.023979	5	-9.338588	5	-10.047190	5	-9.064240
6	-16.535430	6	-16.943439	6	-15.695549	6	-16.427548
7	17.291798	7	17.354210	7	17.028375	7	17.123494
8	3.318123	8	3.597756	8	3.010312	8	3.395279
9	-5.555830	9	-5.608216	9	-5.448828	9	-5.585007

TO = 0 CORRESPOND AU 0 JANVIER 1991 à 0 H SOIT LA DATE JULIENNE 2448256.5

SATELLITES DE SATURNE

SATELLITES OF SATURN

DONNÉES SUR LES SATELLITES DE SATURNE

DATA ON THE SATELLITES OF SATURN

	NOM	masse	rayon	période rotation sidérale	albédo géométrique	magnitude visuelle	période orbitale	élongation maximale	1/2 grand axe	excentricité	inclinaison sur l'équateur de Saturne
	unité →	masse de Saturne	km	jour			jour	(') (")	10^3 km		degré
I	Mimas	6.5×10^{-8}	199	(S)	0.53	12.9	0.942 421 95	30	184.85	0.0191	1.56
II	Enceladus	2.1×10^{-7}	251	(S)	0.99	11.7	1.370 218 081	38	237.39	0.0049	0.026
III	Tethys	1.09×10^{-6}	524	(S)	0.88	10.2	1.887 802 524	48	293.99	0.	1.098
IV	Dione	1.95×10^{-6}	559	(S)	0.65	10.4	2.736 915 55	1 01	376.37	0.00216	0.014
V	Rhea	4.1×10^{-6}	764	(S)	0.67	9.7	4.517 502 66	1 25	525.58	0.000 27 (6)	0.347
VI	Titan	2.367×10^{-4}	2 575	(S)	0.21	8.28	15.945 446 3	3 17	1 217.66	0.029 09	0.30
VII	Hyperion	$3. \times 10^{-8}$	370 x 280 x 225		0.3	14.19	21.276 673 3	3 59	1 476.0	0.103 46	0.644
VIII	Iapetus	2.8×10^{-6}	718	(S)	0.5-0.05	11.2	79.330 954	9 34	3 549.77	0.028 30	18.460 (1)
IX	Phoebe	$7. \times 10^{-10}$	221 x 212	0.4	0.06	16.45	(R) 550.48	34 51	12 952.	0.163 2	177. (1)
X	Janus (5)		110 x 100 x 80	(S)	0.4	14.	0.694 5	24	151.472	0.007	0 14
XI	Epimetheus (5)		70 x 60 x 50	(S)	0.4	15.	0.694 2	24	151.422	0.009	0.34
XII	Hélène (2)		18 x 16 x 15		0.5	17.	2.736 9	1 01	377.40	0.005	0.2
XIII	Telesto (3)		17 x 14 x 13		0.6	18.	1.887 8	48	294.66		
XIV	Calypso (3)		17 x 11 x 11		0.8	18.5	1.887 8	48	294.66		
XV	Atlas		20 x 10		0.4	18.	0.601 9	22	137.670		0.3
XVI	Prometheus (4)		70 x 11 x 40		0.6	15.	0.613 0	23	139.353		0.
XVII	Pandora (4)		55 x 45 x 35		0.6	15.5	0.628 5	23	141.700	0.004	0.1

	NAME	*mass*	*radius*	*sidereal period*	*geometrical albedo*	*visual magnitude*	*orbital period*	*greatest elongation*	*semi major axis*	*eccentricity*	*inclination on Saturn's equator*
	unit →	*Saturn's mass*	*km*	*day*			*day*	*(') (")*	*10^3 km*		*degree*

NOTES

(S) : révolution synchrone
(R) : révolution rétrograde
(1) : inclinaison par rapport à l'écliptique. Les éphémérides de Phœbé sont données sous la forme de coefficients de Tchébycheff dans le supplément à la Connaissance des Temps « Satellites faibles... »
(2) : Hélène : même orbite que Dioné
(3) : Telesto et Calypso : même orbite que Téthys
(4) : satellites coorbitaux « gardiens » de l'anneau F
(5) : Janus et Epimetheus : même orbite
(6) : excentricité propre. L'excentricité forcée due à Titan est de 0.01

(S) : synchronous revolution
(R) : retrograde revolution
(1) : inclination on the ecliptic. The ephemerides of Phœbe are given as Chebychev coefficients in the supplément à la Connaissance des Temps « Faint Satellites... »
(2) : Helene : same orbit as Dione
(3) : Telesto and Calypso : same orbit as Tethys
(4) : satellites on the same orbit « shepherding » F ring
(5) : Janus and Epimetheus : same orbit
(6) : proper eccentricity. The forced eccentricity due to Titan is 0.01

ÉPHÉMÉRIDES DES HUIT PREMIERS SATELLITES DE SATURNE

EPHEMERIDES OF THE FIRST EIGHT SATELLITES OF SATURN

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000.

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000.

$$\Delta\alpha \cos\delta = X$$
$$\Delta\delta = Y$$

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date if the beginning of the interval and T the date for the calculation

satellite	intervalle Δt (jours)	N (rad/j)	page
Mimas	4	6.667 0	58
Encelade	16	4.586 0	65
Téthys	16	3.328 0	67
Dioné	16	2.296 0	69
Rhéa	16	1.391 0	71
Titan	11	0.394 0	73
Hypérion	8	0.394 0	76
Japet	17	0.079 0	80
	(days)	*(rad/d)*	

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	+0.6429	-0.00308	+23.2896	+0.05372	+0.000455	+0.2217
(2448257.5)				4.268951	2.5140	4.2769	3.5295
A JAN. 5 (OH)	Y:	-0.1188	-0.00299	+ 8.7506	+0.02841	+0.000230	+0.0828
				6.074730	4.1063	0.4467	5.3403
JAN. 5 (OH)	X:	+0.6311	-0.00368	+23.2559	+0.05196	+0.000270	+0.2203
(2448261.5)				5.795247	4.1170	5.8903	0.2379
A JAN. 9 (OH)	Y:	-0.1309	-0.00291	+ 8.7092	+0.02704	+0.000225	+0.0826
				1.315103	5.6835	2.3658	2.0459
JAN. 9 (OH)	X:	+0.6157	-0.00414	+23.2362	+0.04960	+0.000352	+0.2193
(2448265.5)				1.038372	5.6578	1.2630	3.2315
A JAN.13 (OH)	Y:	-0.1425	-0.00278	+ 8.6743	+0.02535	+0.000163	+0.0822
				2.838892	0.9568	4.0561	5.0301
JAN.13 (OH)	X:	+0.5998	-0.00462	+23.2259	+0.05034	+0.000370	+0.2198
(2448269.5)				2.565070	0.9153	3.1131	6.2253
A JAN.17 (OH)	Y:	-0.1537	-0.00268	+ 8.6450	+0.02430	+0.000114	+0.0818
				4.363175	2.5157	5.5855	1.7328
JAN.17 (OH)	X:	+0.5806	-0.00518	+23.2193	+0.05013	+0.000468	+0.2209
(2448273.5)				4.091878	2.4958	4.3593	2.9347
A JAN.21 (OH)	Y:	-0.1645	-0.00252	+ 8.6206	+0.02326	+0.000185	+0.0814
				5.887818	4.0776	0.2400	4.7253
JAN.21 (OH)	X:	+0.5604	-0.00563	+23.2204	+0.04906	+0.000440	+0.2210
(2448277.5)				5.618729	4.0991	6.2771	5.9251
A JAN.25 (OH)	Y:	-0.1746	-0.00245	+ 8.6011	+0.02217	+0.000211	+0.0812
				1.129692	5.6703	2.1866	1.4379
JAN.25 (OH)	X:	+0.5373	-0.00609	+23.2336	+0.04665	+0.000400	+0.2201
(2448281.5)				0.862501	5.6744	1.7612	2.6319
A JAN.29 (OH)	Y:	-0.1845	-0.00229	+ 8.5871	+0.02009	+0.000113	+0.0813
				2.655086	0.9770	3.7831	4.4296
JAN.29 (OH)	X:	+0.5135	-0.00653	+23.2576	+0.04643	+0.000414	+0.2196
(2448285.5)				2.389881	0.9367	3.5714	5.6252
A FEV. 2 (OH)	Y:	-0.1936	-0.00216	+ 8.5796	+0.01873	+0.000113	+0.0814
				4.181114	2.5319	5.0618	1.1338
FEV. 2 (OH)	X:	+0.4869	-0.00707	+23.2855	+0.04583	+0.000316	+0.2202
(2448289.5)				3.917493	2.5211	4.5050	2.3393
A FEV. 6 (OH)	Y:	-0.2024	-0.00200	+ 8.5763	+0.01782	+0.000180	+0.0814
				5.707795	4.1038	6.2229	4.1232
FEV. 6 (OH)	X:	+0.4589	-0.00739	+23.3217	+0.04525	+0.000459	+0.2214
(2448293.5)				5.445258	4.1155	0.0520	5.3360
A FEV.10 (OH)	Y:	-0.2103	-0.00189	+ 8.5770	+0.01699	+0.000228	+0.0811
				0.951851	5.7167	1.7415	0.8355
FEV.10 (OH)	X:	+0.4290	-0.00787	+23.3671	+0.04376	+0.000383	+0.2220
(2448297.5)				0.690042	5.7278	2.1563	2.0445
A FEV.14 (OH)	Y:	-0.2181	-0.00169	+ 8.5824	+0.01517	+0.000143	+0.0810
				2.479534	1.0830	3.2224	3.8336
FEV.14 (OH)	X:	+0.3977	-0.00825	+23.4240	+0.04223	+0.000337	+0.2221
(2448301.5)				2.218377	1.0103	3.8030	5.0343
A FEV.18 (OH)	Y:	-0.2247	-0.00154	+ 8.5944	+0.01361	+0.000188	+0.0813
				4.007917	2.6627	4.6906	0.5464
FEV.18 (OH)	X:	+0.3644	-0.00872	+23.4866	+0.04142	+0.000144	+0.2222
(2448305.5)				3.747095	2.5922	4.5630	1.7456
A FEV.22 (OH)	Y:	-0.2311	-0.00136	+ 8.6101	+0.01301	+0.000223	+0.0819
				5.537171	4.2636	6.2082	3.5400
FEV.22 (OH)	X:	+0.3296	-0.00896	+23.5566	+0.04109	+0.000350	+0.2227
(2448309.5)				5.276080	4.1780	6.0613	4.7462
A FEV.26 (OH)	Y:	-0.2364	-0.00118	+ 8.6291	+0.01245	+0.000284	+0.0821
				0.783858	5.9192	1.4810	0.2513

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
FEV.26 (OH)	X:	+0.2938	-0.00944	+23.6335	+0.04108	+0.000295	+0.2238
(2448313.5)				0.522177	5.8106	2.2500	1.4625
A MAR. 2 (OH)	Y:	-0.2414	-0.00095	+ 8.6520	+0.01161	+0.000224	+0.0820
				2.314279	1.3686	3.1326	3.2487
MAR. 2 (OH)	X:	+0.2558	-0.00974	+23.7215	+0.03882	+0.000149	+0.2252
(2448317.5)				2.051745	1.1307	3.6179	4.4562
A MAR. 6 (OH)	Y:	-0.2450	-0.00075	+ 8.6810	+0.01045	+0.000255	+0.0820
				3.845408	3.0412	4.7172	6.2489
MAR. 6 (OH)	X:	+0.2169	-0.01009	+23.8174	+0.03780	+0.000126	+0.2264
(2448321.5)				3.581823	2.7018	3.8084	1.1650
A MAR.10 (OH)	Y:	-0.2483	-0.00053	+ 8.7135	+0.01034	+0.000268	+0.0825
				5.377497	4.6759	0.1107	2.9673
MAR.10 (OH)	X:	+0.1763	-0.01031	+23.9184	+0.03788	+0.000337	+0.2269
(2448325.5)				5.112275	4.2838	5.4508	4.1622
A MAR.14 (OH)	Y:	-0.2502	-0.00027	+ 8.7483	+0.01048	+0.000298	+0.0833
				0.627025	0.0935	1.4374	5.9681
MAR.14 (OH)	X:	+0.1354	-0.01071	+24.0248	+0.03922	+0.000252	+0.2272
(2448329.5)				0.359883	5.9129	1.5658	0.8812
A MAR.18 (OH)	Y:	-0.2515	-0.00002	+ 8.7868	+0.01108	+0.000282	+0.0837
				2.160346	1.8312	3.1884	2.6836
MAR.18 (OH)	X:	+0.0920	-0.01088	+24.1411	+0.03752	+0.000180	+0.2284
(2448333.5)				1.890921	1.2749	2.3560	3.8826
A MAR.22 (OH)	Y:	-0.2515	+0.00023	+ 8.8301	+0.01136	+0.000271	+0.0837
				3.694346	3.5539	4.8936	5.6822
MAR.22 (OH)	X:	+0.0489	-0.01111	+24.2672	+0.03611	+0.000291	+0.2307
(2448337.5)				3.422550	2.8431	3.8442	0.5969
A MAR.26 (OH)	Y:	-0.2508	+0.00049	+ 8.8771	+0.01177	+0.000281	+0.0840
				5.229265	5.1831	0.3143	2.4019
MAR.26 (OH)	X:	+0.0040	-0.01129	+24.3958	+0.03676	+0.000405	+0.2326
(2448341.5)				4.954656	4.4226	5.2933	3.5934
A MAR.30 (OH)	Y:	-0.2486	+0.00081	+ 8.9260	+0.01267	+0.000244	+0.0846
				0.481627	0.5572	1.5032	5.4093
MAR.30 (OH)	X:	-0.0406	-0.01150	+24.5283	+0.03864	+0.000428	+0.2333
(2448345.5)				0.203921	6.0328	1.0524	0.3095
A AVR. 3 (OH)	Y:	-0.2455	+0.00107	+ 8.9781	+0.01393	+0.000270	+0.0854
				2.017778	2.1974	3.2180	2.1327
AVR. 3 (OH)	X:	-0.0873	-0.01153	+24.6686	+0.03855	+0.000360	+0.2335
(2448349.5)				1.736630	1.4091	2.4342	3.3118
A AVR. 7 (OH)	Y:	-0.2411	+0.00139	+ 9.0335	+0.01541	+0.000235	+0.0860
				3.554542	3.8429	5.1415	5.1341
AVR. 7 (OH)	X:	-0.1327	-0.01161	+24.8190	+0.03703	+0.000478	+0.2350
(2448353.5)				3.269926	2.9931	4.1198	0.0321
A AVR.11 (OH)	Y:	-0.2357	+0.00169	+ 9.0927	+0.01611	+0.000237	+0.0864
				5.092063	5.4551	0.4605	1.8515
AVR.11 (OH)	X:	-0.1799	-0.01169	+24.9698	+0.03816	+0.000421	+0.2377
(2448357.5)				4.803780	4.5671	5.6403	3.0348
A AVR.15 (OH)	Y:	-0.2288	+0.00203	+ 9.1535	+0.01715	+0.000159	+0.0868
				0.347032	0.7763	1.5733	4.8578
AVR.15 (OH)	X:	-0.2262	-0.01163	+25.1233	+0.03983	+0.000579	+0.2400
(2448361.5)				0.054773	6.1657	1.0307	6.0356
A AVR.19 (OH)	Y:	-0.2207	+0.00230	+ 9.2169	+0.01833	+0.000199	+0.0874
				1.885726	2.3635	3.0942	1.5867
AVR.19 (OH)	X:	-0.2732	-0.01152	+25.2820	+0.04124	+0.000515	+0.2407
(2448365.5)				1.589275	1.5239	2.7891	2.7524
A AVR.23 (OH)	Y:	-0.2115	+0.00266	+ 9.2823	+0.02017	+0.000175	+0.0882
				3.424948	3.9446	5.3555	4.5964

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AVR.23 (OH)	X:	-0.3188	-0.01140	+25.4486	+0.04036	+0.000561	+0.2413
(2448369.5)				3.124301	3.1345	4.4668	5.7545
A AVR.27 (OH)	Y:	-0.2008	+0.00296	+ 9.3513	+0.02107	+0.000147	+0.0891
				4.964703	5.5483	0.5209	1.3173
AVR.27 (OH)	X:	-0.3650	-0.01126	+25.6145	+0.04130	+0.000450	+0.2430
(2448373.5)				4.659927	4.7048	6.2617	2.4777
A MAI 1 (OH)	Y:	-0.1890	+0.00329	+ 9.4218	+0.02173	+0.000086	+0.0899
				0.221883	0.8459	1.4738	4.3209
MAI 1 (OH)	X:	-0.4097	-0.01089	+25.7808	+0.04237	+0.000542	+0.2456
(2448377.5)				6.195862	0.0176	1.1687	5.4853
A MAI 5 (OH)	Y:	-0.1758	+0.00356	+ 9.4936	+0.02259	+0.000125	+0.0903
				1.762683	2.4121	2.6510	1.0474
MAI 5 (OH)	X:	-0.4536	-0.01062	+25.9491	+0.04426	+0.000601	+0.2478
(2448381.5)				1.448982	1.6258	3.0800	2.2056
A MAI 9 (OH)	Y:	-0.1617	+0.00390	+ 9.5662	+0.02416	+0.000113	+0.0908
				3.303885	3.9616	5.2984	4.0612
MAI 9 (OH)	X:	-0.4959	-0.01021	+26.1212	+0.04481	+0.000544	+0.2490
(2448385.5)				2.985705	3.2529	4.9218	5.2056
A MAI 13 (OH)	Y:	-0.1459	+0.00416	+ 9.6416	+0.02516	+0.000068	+0.0917
				4.845392	5.5560	0.2292	0.7894
MAI 13 (OH)	X:	-0.5372	-0.00978	+26.2925	+0.04501	+0.000528	+0.2500
(2448389.5)				4.523011	4.8341	0.4928	1.9254
A MAI 17 (OH)	Y:	-0.1294	+0.00443	+ 9.7186	+0.02528	+0.000074	+0.0929
				0.104249	0.8466	1.1129	3.7966
MAI 17 (OH)	X:	-0.5761	-0.00911	+26.4609	+0.04531	+0.000368	+0.2515
(2448393.5)				6.060653	0.1484	1.5155	4.9348
A MAI 21 (OH)	Y:	-0.1115	+0.00468	+ 9.7950	+0.02579	+0.000095	+0.0938
				1.646618	2.4013	2.1678	0.5205
MAI 21 (OH)	X:	-0.6127	-0.00863	+26.6274	+0.04647	+0.000534	+0.2536
(2448397.5)				1.315481	1.7333	3.2879	1.6623
A MAI 25 (OH)	Y:	-0.0930	+0.00494	+ 9.8712	+0.02675	+0.000090	+0.0942
				3.189224	3.9412	4.8556	3.5312
MAI 25 (OH)	X:	-0.6473	-0.00787	+26.7918	+0.04842	+0.000509	+0.2558
(2448401.5)				2.853792	3.3559	5.4744	4.6669
A MAI 29 (OH)	Y:	-0.0730	+0.00511	+ 9.9486	+0.02764	+0.000056	+0.0946
				4.731948	5.5243	6.2182	0.2613
MAI 29 (OH)	X:	-0.6788	-0.00712	+26.9552	+0.04776	+0.000518	+0.2576
(2448405.5)				4.392585	4.9593	0.8310	1.3849
A JUN. 2 (OH)	Y:	-0.0528	+0.00528	+10.0269	+0.02722	+0.000094	+0.0956
				6.275054	0.8171	1.3284	3.2740
JUN. 2 (OH)	X:	-0.7073	-0.00621	+27.1118	+0.04701	+0.000239	+0.2588
(2448409.5)				5.931745	0.2727	2.1540	4.3898
A JUN. 6 (OH)	Y:	-0.0315	+0.00545	+10.1026	+0.02725	+0.000053	+0.0968
				1.535195	2.3657	2.6644	0.0015
JUN. 6 (OH)	X:	-0.7321	-0.00544	+27.2619	+0.04701	+0.000335	+0.2596
(2448413.5)				1.188019	1.8521	3.3835	1.1178
A JUN.10 (OH)	Y:	-0.0099	+0.00555	+10.1766	+0.02752	+0.000106	+0.0977
				3.078568	3.9103	4.7457	3.0103
JUN.10 (OH)	X:	-0.7542	-0.00434	+27.4043	+0.04057	+0.000487	+0.2610
(2448417.5)				2.727664	3.4544	5.8654	4.1289
A JUN.14 (OH)	Y:	+0.0125	+0.00561	+10.2497	+0.02805	+0.000098	+0.0980
				4.621923	5.4822	0.4825	6.0194
JUN.14 (OH)	X:	-0.7712	-0.00334	+27.5443	+0.04858	+0.000423	+0.2633
(2448421.5)				4.267633	5.0840	1.0463	0.8518
A JUN.18 (OH)	Y:	+0.0347	+0.00564	+10.3223	+0.02734	+0.000133	+0.0983
				6.165451	0.7820	2.0661	2.7478

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUN.18 (OH)	X:	-0.7849	-0.00225	+27.6741	+0.04647	+0.000229	+0.2655
(2448425.5)				5.807981	0.4020	2.5374	3.8553
A JUN.22 (OH)	Y:	+0.0575	+0.00566	+10.3905	+0.02675	+0.000134	+0.0992
				1.425918	2.3337	4.2251	5.7619
JUN.22 (OH)	X:	-0.7936	-0.00118	+27.7918	+0.04547	+0.000120	+0.2662
(2448429.5)				1.065301	1.9898	3.4435	0.5786
A JUN.26 (OH)	Y:	+0.0800	+0.00557	+10.4549	+0.02625	+0.000120	+0.1003
				2.969427	3.8948	5.3676	2.4914
JUN.26 (OH)	X:	-0.7988	+0.00009	+27.8972	+0.04727	+0.000402	+0.2660
(2448433.5)				2.605868	3.5683	5.9595	3.5888
A JUN.30 (OH)	Y:	+0.1024	+0.00549	+10.5158	+0.02609	+0.000188	+0.1010
				4.512806	5.4623	0.9506	5.4992
JUN.30 (OH)	X:	-0.7978	+0.00123	+27.9974	+0.04664	+0.000327	+0.2668
(2448437.5)				4.146555	5.2127	1.0139	0.3160
A JUL. 4 (OH)	Y:	+0.1242	+0.00535	+10.5737	+0.02533	+0.000232	+0.1012
				6.056108	0.7729	2.7128	2.2220
JUL. 4 (OH)	X:	-0.7935	+0.00240	+28.0854	+0.04345	+0.000289	+0.2690
(2448441.5)				5.687557	0.5485	2.2326	3.3240
A JUL. 8 (OH)	Y:	+0.1458	+0.00518	+10.6258	+0.02408	+0.000294	+0.1014
				1.316231	2.3430	4.5057	5.2320
JUL. 8 (OH)	X:	-0.7834	+0.00365	+28.1567	+0.04210	+0.000076	+0.2708
(2448445.5)				0.945370	2.1517	4.2085	0.0467
A JUL.12 (OH)	Y:	+0.1664	+0.00490	+10.6720	+0.02289	+0.000195	+0.1020
				2.859264	3.9314	6.0976	1.9633
JUL.12 (OH)	X:	-0.7693	+0.00487	+28.2131	+0.04228	+0.000336	+0.2707
(2448449.5)				2.486295	3.7246	5.7125	3.0522
A JUL.16 (OH)	Y:	+0.1861	+0.00467	+10.7122	+0.02188	+0.000272	+0.1027
				4.402052	5.5096	1.2773	4.9753
JUL.16 (OH)	X:	-0.7492	+0.00599	+28.2604	+0.04214	+0.000388	+0.2697
(2448453.5)				4.027140	5.3658	0.8018	6.0593
A JUL.20 (OH)	Y:	+0.2048	+0.00434	+10.7465	+0.02124	+0.000369	+0.1031
				5.944516	0.8346	3.0866	1.6971
JUL.20 (OH)	X:	-0.7259	+0.00709	+28.2950	+0.03890	+0.000457	+0.2699
(2448457.5)				5.568134	0.7380	2.0982	2.7856
A JUL.24 (OH)	Y:	+0.2222	+0.00400	+10.7742	+0.01956	+0.000411	+0.1033
				1.203638	2.4552	4.6793	4.7004
JUL.24 (OH)	X:	-0.6970	+0.00827	+28.3102	+0.03751	+0.000271	+0.2714
(2448461.5)				0.825781	2.3616	4.3999	5.7952
A JUL.28 (OH)	Y:	+0.2382	+0.00358	+10.7939	+0.01790	+0.000302	+0.1033
				2.745593	4.0974	0.1643	1.4255
JUL.28 (OH)	X:	-0.6643	+0.00921	+28.3103	+0.03627	+0.000362	+0.2722
(2448465.5)				2.366381	3.9619	5.5478	2.5180
A AOU. 1 (OH)	Y:	+0.2525	+0.00322	+10.8055	+0.01633	+0.000302	+0.1032
				4.287162	5.7256	1.5910	4.4382
AOU. 1 (OH)	X:	-0.6271	+0.01016	+28.2978	+0.03610	+0.000577	+0.2714
(2448469.5)				3.906726	5.5829	0.7719	5.5202
A AOU. 5 (OH)	Y:	+0.2655	+0.00275	+10.8089	+0.01590	+0.000449	+0.1034
				5.828198	1.0692	3.2954	1.1638
AOU. 5 (OH)	X:	-0.5869	+0.01100	+28.2742	+0.03458	+0.000632	+0.2701
(2448473.5)				5.446973	0.9920	2.2756	2.2404
A AOU. 9 (OH)	Y:	+0.2763	+0.00229	+10.8059	+0.01484	+0.000429	+0.1037
				1.085693	2.7882	4.8333	4.1663
AOU. 9 (OH)	X:	-0.5425	+0.01187	+28.2319	+0.03362	+0.000586	+0.2695
(2448477.5)				0.703775	2.6489	4.4397	5.2485
A AOU.13 (OH)	Y:	+0.2856	+0.00181	+10.7939	+0.01366	+0.000351	+0.1037
				2.625999	4.5381	0.2926	0.8844

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AOU.13 (OH)	X:	-0.4952	+0.01238	+28.1755	+0.03234	+0.000443	+0.2697
(2448481.5)				2.243384	4.3098	5.8493	1.9748
A AOU.17 (OH)	Y:	+0.2927	+0.00137	+10.7726	+0.01285	+0.000294	+0.1031
				4.165757	6.2750	1.9084	3.8899
AOU.17 (OH)	X:	-0.4456	+0.01304	+28.1049	+0.03134	+0.000719	+0.2696
(2448485.5)				3.782594	5.9263	0.9280	4.9784
A AOU.21 (OH)	Y:	+0.2984	+0.00084	+10.7420	+0.01280	+0.000421	+0.1025
				5.704828	1.6465	3.4102	0.6144
AOU.21 (OH)	X:	-0.3934	+0.01347	+28.0253	+0.03236	+0.000739	+0.2687
(2448489.5)				5.321413	1.3234	2.6355	1.6935
A AOU.25 (OH)	Y:	+0.3015	+0.00037	+10.7058	+0.01378	+0.000358	+0.1022
				0.960152	3.4015	4.9459	3.6195
AOU.25 (OH)	X:	-0.3395	+0.01387	+27.9319	+0.03273	+0.000802	+0.2672
(2448493.5)				0.576729	3.0112	4.5485	4.6936
A AOU.29 (OH)	Y:	+0.3032	-0.00007	+10.6610	+0.01459	+0.000302	+0.1023
				2.498267	5.1608	0.2620	0.3374
AOU.29 (OH)	X:	-0.2839	+0.01398	+27.8259	+0.03290	+0.000566	+0.2656
(2448497.5)				2.114765	4.7080	6.2775	1.4164
A SEP. 2 (OH)	Y:	+0.3027	-0.00054	+10.6070	+0.01553	+0.000259	+0.1019
				4.035692	0.6068	2.1209	3.3367
SEP. 2 (OH)	X:	-0.2282	+0.01426	+27.7071	+0.03168	+0.000689	+0.2645
(2448501.5)				3.652298	0.0707	1.1858	4.4229
A SEP. 6 (OH)	Y:	+0.3007	-0.00100	+10.5449	+0.01608	+0.000302	+0.1009
				5.572347	2.2453	3.4291	0.0536
SEP. 6 (OH)	X:	-0.1707	+0.01423	+27.5819	+0.03383	+0.000791	+0.2639
(2448505.5)				5.189207	1.6757	3.0274	1.1401
A SEP.10 (OH)	Y:	+0.2964	-0.00140	+10.4779	+0.01799	+0.000256	+0.0997
				0.825100	3.8747	4.8853	3.0549
SEP.10 (OH)	X:	-0.1141	+0.01418	+27.4498	+0.03630	+0.000798	+0.2633
(2448509.5)				0.442582	3.3523	4.7267	4.1358
A SEP.14 (OH)	Y:	+0.2910	-0.00177	+10.4046	+0.02005	+0.000227	+0.0991
				2.360589	5.5463	6.2634	6.0567
SEP.14 (OH)	X:	-0.0570	+0.01397	+27.3068	+0.03788	+0.000654	+0.2616
(2448513.5)				1.978657	5.0349	0.2988	0.8502
A SEP.18 (OH)	Y:	+0.2837	-0.00217	+10.3232	+0.02157	+0.000223	+0.0988
				3.895315	0.8872	2.0507	2.7735
SEP.18 (OH)	X:	-0.0016	+0.01385	+27.1542	+0.03762	+0.000516	+0.2590
(2448517.5)				3.514141	0.4097	1.6497	3.8520
A SEP.22 (OH)	Y:	+0.2752	-0.00247	+10.2360	+0.02256	+0.000179	+0.0981
				5.429239	2.4966	3.3228	5.7694
SEP.22 (OH)	X:	+0.0544	+0.01344	+26.9982	+0.03870	+0.000701	+0.2570
(2448521.5)				5.048883	1.9687	3.3680	0.5707
A SEP.26 (OH)	Y:	+0.2650	-0.00277	+10.1450	+0.02383	+0.000191	+0.0968
				0.679185	4.0736	4.5407	2.4794
SEP.26 (OH)	X:	+0.1075	+0.01305	+26.8424	+0.04240	+0.000580	+0.2563
(2448525.5)				0.300067	3.5921	4.9694	3.5688
A SEP.30 (OH)	Y:	+0.2541	-0.00301	+10.0506	+0.02580	+0.000202	+0.0955
				2.211770	5.6689	5.9061	5.4745
SEP.30 (OH)	X:	+0.1603	+0.01264	+26.6783	+0.04456	+0.000554	+0.2559
(2448529.5)				1.834011	5.2432	0.4235	0.2806
A OCT. 4 (OH)	Y:	+0.2419	-0.00328	+ 9.9510	+0.02719	+0.000219	+0.0946
				3.743632	0.9679	1.7630	2.1901
OCT. 4 (OH)	X:	+0.2103	+0.01215	+26.5088	+0.04546	+0.000404	+0.2539
(2448533.5)				3.367318	0.5933	2.3090	3.2752
A OCT. 8 (OH)	Y:	+0.2288	-0.00342	+ 9.8481	+0.02838	+0.000125	+0.0938
				5.274728	2.5557	3.2289	5.1881

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		AO	A1	BO FO	B1 F1	B2 F2	CO PO
OCT. 8 (OH)	X:	+0.2596	+0.01153	+26.3385	+0.04530	+0.000466	+0.2509
(2448537.5)				4.899903	2.1585	3.6734	6.2712
A OCT.12 (OH)	Y:	+0.2150	-0.00361	+ 9.7426	+0.02885	+0.000185	+0.0929
				0.521852	4.1263	4.2698	1.8964
OCT.12 (OH)	X:	+0.3049	+0.01094	+26.1730	+0.04840	+0.000302	+0.2486
(2448541.5)				0.148892	3.7360	5.2340	2.9852
A OCT.16 (OH)	Y:	+0.2006	-0.00372	+ 9.6368	+0.03009	+0.000198	+0.0918
				2.051493	5.6794	5.9255	4.8838
OCT.16 (OH)	X:	+0.3494	+0.01039	+26.0034	+0.05057	+0.000300	+0.2478
(2448545.5)				1.680727	5.3580	0.2664	5.9824
A OCT.20 (OH)	Y:	+0.1856	-0.00385	+ 9.5290	+0.03127	+0.000224	+0.0905
				3.580548	0.9584	1.6519	1.5908
OCT.20 (OH)	X:	+0.3904	+0.00964	+25.8324	+0.05189	+0.000349	+0.2472
(2448549.5)				3.211940	0.6737	2.7104	2.6940
A OCT.24 (OH)	Y:	+0.1701	-0.00386	+ 9.4202	+0.03236	+0.000127	+0.0893
				5.108944	2.5323	3.5623	4.5864
OCT.24 (OH)	X:	+0.4294	+0.00899	+25.6632	+0.05139	+0.000193	+0.2452
(2448553.5)				4.742560	2.2541	4.0935	5.6850
A OCT.28 (OH)	Y:	+0.1547	-0.00396	+ 9.3104	+0.03227	+0.000142	+0.0883
				0.353441	4.1055	4.4038	1.2979
OCT.28 (OH)	X:	+0.4649	+0.00829	+25.5006	+0.05247	+0.000092	+0.2425
(2448557.5)				6.272742	3.8095	4.6416	2.3918
A NOV. 1 (OH)	Y:	+0.1387	-0.00396	+ 9.2028	+0.03255	+0.000172	+0.0875
				1.880395	5.6382	0.0447	4.2862
NOV. 1 (OH)	X:	+0.4986	+0.00766	+25.3393	+0.05436	+0.000204	+0.2403
(2448561.5)				1.519489	5.3994	5.5362	5.3856
A NOV. 5 (OH)	Y:	+0.1230	-0.00397	+ 9.0966	+0.03354	+0.000180	+0.0866
				3.406963	0.9049	1.8472	0.9877
NOV. 5 (OH)	X:	+0.5289	+0.00680	+25.1795	+0.05571	+0.000266	+0.2392
(2448565.5)				3.048911	0.6880	2.4526	2.0994
A NOV. 9 (OH)	Y:	+0.1069	-0.00393	+ 8.9907	+0.03428	+0.000152	+0.0855
				4.933037	2.4719	3.9771	3.9750
NOV. 9 (OH)	X:	+0.5563	+0.00622	+25.0233	+0.05573	+0.000076	+0.2383
(2448569.5)				4.577892	2.2751	4.6540	5.0934
A NOV.13 (OH)	Y:	+0.0913	-0.00394	+ 8.8857	+0.03394	+0.000085	+0.0841
				0.175329	4.0449	5.4354	0.6833
NOV.13 (OH)	X:	+0.5811	+0.00546	+24.8735	+0.05462	+0.000201	+0.2369
(2448573.5)				6.106425	3.8319	3.7319	1.7979
A NOV.17 (OH)	Y:	+0.0753	-0.00387	+ 8.7843	+0.03337	+0.000142	+0.0830
				1.700141	5.5749	0.7864	3.6744
NOV.17 (OH)	X:	+0.6030	+0.00479	+24.7308	+0.05583	+0.000270	+0.2351
(2448577.5)				1.351578	5.3881	5.3189	4.7845
A NOV.21 (OH)	Y:	+0.0600	-0.00380	+ 8.6871	+0.03397	+0.000119	+0.0824
				3.224765	0.8334	2.6444	0.3789
NOV.21 (OH)	X:	+0.6221	+0.00399	+24.5919	+0.05718	+0.000299	+0.2332
(2448581.5)				2.879619	0.6612	1.8797	1.4931
A NOV.25 (OH)	Y:	+0.0445	-0.00375	+ 8.5913	+0.03415	+0.000148	+0.0818
				4.749123	2.3975	4.4001	3.3642
NOV.25 (OH)	X:	+0.6379	+0.00345	+24.4574	+0.05780	+0.000144	+0.2316
(2448585.5)				4.407364	2.2452	3.9987	4.4892
A NOV.29 (OH)	Y:	+0.0297	-0.00368	+ 8.4980	+0.03362	+0.000152	+0.0808
				6.273049	3.9648	0.1630	0.0663
NOV.29 (OH)	X:	+0.6521	+0.00267	+24.3285	+0.05544	+0.000282	+0.2307
(2448589.5)				5.934700	3.8149	4.0352	1.1988
A DEC. 3 (OH)	Y:	+0.0147	-0.00359	+ 8.4091	+0.03250	+0.000146	+0.0795
				1.513338	5.5035	1.6639	3.0532

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS N=6.667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
DEC. 3 (OH)	X:	+0.6623	+0.00203	+24.2113	+0.05575	+0.000262	+0.2302
(2448593.5)				1.178682	5.3444	5.9073	4.1860
A DEC. 7 (OH)	Y:	+0.0006	-0.00350	+ 8.3259	+0.03244	+0.000141	+0.0785
				3.036786	0.7561	3.5952	6.0418
DEC. 7 (OH)	X:	+0.5708	+0.00135	+24.0994	+0.05732	+0.000357	+0.2295
(2448597.5)				2.705796	0.6129	1.8721	0.8891
A DEC.11 (OH)	Y:	-0.0136	-0.00344	+ 8.2449	+0.03208	+0.000118	+0.0780
				4.560222	2.3162	4.9720	2.7481
DEC.11 (OH)	X:	+0.6757	+0.00079	+23.9918	+0.05804	+0.000356	+0.2277
(2448601.5)				4.232712	2.1926	3.9563	3.8799
A DEC.15 (OH)	Y:	-0.0272	-0.00332	+ 8.1677	+0.03136	+0.000204	+0.0776
				6.083446	3.8738	0.3947	5.7356
DEC.15 (OH)	X:	+0.6795	+0.00006	+23.8901	+0.05552	+0.000252	+0.2259
(2448605.5)				5.759313	3.7772	4.7698	0.5906
A DEC.19 (OH)	Y:	-0.0407	-0.00324	+ 8.0950	+0.02999	+0.000182	+0.0768
				1.323347	5.4256	2.2276	2.4364
DEC.19 (OH)	X:	+0.6790	-0.00050	+23.8025	+0.05468	+0.000294	+0.2252
(2448609.5)				1.002599	5.2991	0.5117	3.5830
A DEC.23 (OH)	Y:	-0.0535	-0.00314	+ 8.0281	+0.02904	+0.000159	+0.0759
				2.846527	0.6765	3.9921	5.4200
DEC.23 (OH)	X:	+0.6776	-0.00108	+23.7218	+0.05629	+0.000319	+0.2255
(2448613.5)				2.529234	0.5663	2.3389	0.2893
A DEC.27 (OH)	Y:	-0.0662	-0.00307	+ 7.9649	+0.02825	+0.000101	+0.0751
				4.369964	2.2278	5.5480	2.1251
DEC.27 (OH)	X:	+0.6727	-0.00168	+23.6449	+0.05656	+0.000480	+0.2253
(2448617.5)				4.055752	2.1427	4.0317	3.2777
A DEC.31 (OH)	Y:	-0.0785	-0.00292	+ 7.9057	+0.02738	+0.000184	+0.0747
				5.893479	3.7750	0.3755	5.1175
DEC.31 (OH)	X:	+0.6665	-0.00229	+23.5748	+0.05468	+0.000320	+0.2238
(2448621.5)				5.582082	3.7351	5.7072	6.2670
A JAN. 4 (OH)	Y:	-0.0902	-0.00286	+ 7.8506	+0.02606	+0.000190	+0.0743
				1.133984	5.3378	2.3546	1.8243

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE SATURNE: ENCELADE N=4.586

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (0H) (2448257.5)	X:	+0.0963	-0.00071	+29.8530 4.669722	+0.08241 2.9516	+0.000233 4.7963	+0.0702 3.4536
A JAN.17 (0H)	Y:	-0.0849	+0.00000	+11.9181 0.216366	+0.03369 4.2767	+0.000131 0.9849	+0.0277 5.2882
JAN.17 (0H) (2448273.5)	X:	+0.0861	-0.00088	+29.7461 2.603900	+0.07924 1.0258	+0.000250 2.9371	+0.0701 5.5460
A FEV. 2 (0H)	Y:	-0.0845	+0.00010	+11.6226 4.442441	+0.03008 2.2734	+0.000151 5.1790	+0.0271 1.1060
FEV. 1 (0H) (2448288.5)	X:	+0.0750	-0.00091	+29.8146 2.239596	+0.07574 0.7912	+0.000322 2.6749	+0.0705 4.7622
A FEV.17 (0H)	Y:	-0.0831	+0.00005	+11.3963 4.086727	+0.02611 1.9932	+0.000158 4.8807	+0.0266 0.3315
FEV.17 (0H) (2448304.5)	X:	+0.0617	-0.00075	+30.0589 0.178531	+0.07186 5.1789	+0.000342 0.7868	+0.0711 0.5799
A MAR. 5 (0H)	Y:	-0.0827	+0.00012	+11.2234 2.034851	+0.02162 0.0462	+0.000176 2.7738	+0.0263 2.4406
MAR. 1 (0H) (2448316.5)	X:	+0.0524	-0.00088	+30.3529 4.918715	+0.06945 3.7819	+0.000333 5.7698	+0.0720 3.7302
A MAR.17 (0H)	Y:	-0.0811	+0.00000	+11.1401 0.498423	+0.01804 4.8954	+0.000195 1.0708	+0.0261 5.5979
MAR.17 (0H) (2448332.5)	X:	+0.0396	-0.00105	+30.8904 2.865954	+0.06606 1.9306	+0.000359 3.8797	+0.0734 5.8436
A AVR. 2 (0H)	Y:	-0.0810	+0.00009	+11.0955 4.737053	+0.01380 3.1327	+0.000205 5.2514	+0.0261 1.4347
AVR. 1 (0H) (2448347.5)	X:	+0.0255	-0.00124	+31.5297 2.517755	+0.06273 1.7839	+0.000380 3.5888	+0.0751 5.0814
A AVR.17 (0H)	Y:	-0.0801	+0.00006	+11.1299 4.395511	+0.01183 3.2358	+0.000213 4.9464	+0.0263 0.6797
AVR.17 (0H) (2448363.5)	X:	+0.0061	-0.00115	+32.3254 0.477407	+0.06057 6.2607	+0.000396 1.8166	+0.0770 0.9252
A MAI 3 (0H)	Y:	-0.0796	+0.00008	+11.2531 2.360410	+0.01282 1.7368	+0.000210 2.9110	+0.0267 2.8086
MAI 1 (0H) (2448377.5)	X:	-0.0103	-0.00145	+33.0902 1.839626	+0.05850 1.5366	+0.000468 3.3398	+0.0787 3.5775
A MAI 17 (0H)	Y:	-0.0782	+0.00002	+11.4331 3.725269	+0.01628 3.4494	+0.000173 4.3249	+0.0272 5.4617
MAI 17 (0H) (2448393.5)	X:	-0.0322	-0.00167	+33.9921 6.095894	+0.05584 6.0496	+0.000473 1.6160	+0.0810 5.7161
A JUN. 2 (0H)	Y:	-0.0779	+0.00014	+11.7201 1.699179	+0.02075 1.6363	+0.000139 2.4823	+0.0279 1.3176
JUN. 1 (0H) (2448408.5)	X:	-0.0558	-0.00182	+34.8038 5.772746	+0.05313 5.9692	+0.000523 1.6584	+0.0827 4.9779
A JUN.17 (0H)	Y:	-0.0762	+0.00017	+12.0525 1.374315	+0.02423 1.4452	+0.000083 2.4734	+0.0288 0.5754
JUN.17 (0H) (2448424.5)	X:	-0.0847	-0.00167	+35.5626 3.758260	+0.04835 4.2507	+0.000537 0.0419	+0.0844 0.8429
A JUL. 3 (0H)	Y:	-0.0739	+0.00027	+12.4483 5.639014	+0.02612 5.8048	+0.000075 1.7805	+0.0298 2.7193

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE SATURNE: ENCELADE N=4.586

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL. 1 (OH)	X:	-0.1093	-0.00172	+36.0709	+0.04363	+0.000605	+0.0855
(2448438.5)				5.140795	5.9300	1.8499	3.5072
A JUL.17 (OH)	Y:	-0.0700	+0.00029	+12.7987	+0.02498	+0.000123	+0.0306
				0.733418	0.9689	3.7044	5.3832
JUL.17 (OH)	X:	-0.1360	-0.00170	+36.4127	+0.03660	+0.000661	+0.0862
(2448454.5)				3.132769	4.3437	0.2005	5.6565
A AOU. 2 (OH)	Y:	-0.0655	+0.00049	+13.1560	+0.02096	+0.000217	+0.0315
				5.001828	5.3161	2.0184	1.2409
AOU. 1 (OH)	X:	-0.1600	-0.00150	+36.4639	+0.03201	+0.000685	+0.0864
(2448469.5)				2.820917	4.5786	0.2185	4.9198
A AOU.17 (OH)	Y:	-0.0587	+0.00054	+13.4066	+0.01426	+0.000285	+0.0320
				4.683507	5.0674	1.7967	0.4985
AOU.17 (OH)	X:	-0.1831	-0.00104	+36.2204	+0.03276	+0.000693	+0.0856
(2448485.5)				0.810104	3.2384	4.7465	0.7787
A SEP. 2 (OH)	Y:	-0.0507	+0.00064	+13.5479	+0.00473	+0.000308	+0.0323
				2.666228	3.2506	6.1877	2.6324
SEP. 1 (OH)	X:	-0.1984	-0.00087	+35.7436	+0.04072	+0.000634	+0.0846
(2448500.5)				0.490968	3.4474	4.6972	0.0296
A SEP.17 (OH)	Y:	-0.0419	+0.00068	+13.5426	+0.00494	+0.000312	+0.0322
				2.342210	5.7476	5.9328	1.8813
SEP.17 (OH)	X:	-0.2130	-0.00032	+35.0258	+0.05187	+0.000585	+0.0829
(2448516.5)				4.751269	1.7984	2.9421	2.1564
A OCT. 3 (OH)	Y:	-0.0315	+0.00059	+13.3951	+0.01490	+0.000263	+0.0319
				0.315869	3.8905	3.9967	4.0036
OCT. 1 (OH)	X:	-0.2176	-0.00041	+34.2855	+0.06154	+0.000449	+0.0814
(2448530.5)				6.116268	3.4247	4.3995	4.7950
A OCT.17 (OH)	Y:	-0.0228	+0.00055	+13.1622	+0.02219	+0.000227	+0.0313
				1.679246	5.2978	5.5360	0.3585
OCT.17 (OH)	X:	-0.2227	-0.00008	+33.3881	+0.07126	+0.000358	+0.0796
(2448546.5)				4.077824	1.5928	2.6448	0.6226
A NOV. 2 (OH)	Y:	-0.0144	+0.00058	+12.8045	+0.02878	+0.000160	+0.0304
				5.924523	3.3234	3.5755	2.4711
NOV. 1 (OH)	X:	-0.2231	-0.00010	+32.5582	+0.07736	+0.000299	+0.0778
(2448561.5)				3.730291	1.4060	2.4295	6.1283
A NOV.17 (OH)	Y:	-0.0065	+0.00052	+12.4119	+0.03330	+0.000084	+0.0295
				5.579532	3.0194	3.4461	1.6969
NOV.17 (OH)	X:	-0.2255	+0.00028	+31.7473	+0.08233	+0.000212	+0.0763
(2448577.5)				1.677378	5.7851	0.7574	1.9425
A DEC. 3 (OH)	Y:	+0.0012	+0.00041	+11.9592	+0.03579	+0.000024	+0.0284
				3.531367	1.0113	1.7155	3.7996
DEC. 1 (OH)	X:	-0.2217	-0.00004	+31.1343	+0.08378	+0.000273	+0.0750
(2448591.5)				3.017938	0.9448	2.3752	4.5610
A DEC.17 (OH)	Y:	+0.0074	+0.00032	+11.5545	+0.03658	+0.000042	+0.0275
				4.878005	2.3967	6.0819	0.1400
DEC.17 (OH)	X:	-0.2206	+0.00006	+30.5690	+0.08402	+0.000252	+0.0739
(2448607.5)				0.955937	5.2951	0.6501	0.3676
A JAN. 2 (OH)	Y:	+0.0123	+0.00039	+11.1022	+0.03582	+0.000083	+0.0265
				2.824386	0.3648	3.8512	2.2415

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE SATURNE: TETHYS N=3.328

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.0006	+0.00000	+37.0365	+0.07281	+0.000373	+0.0032
(2448257.5)				3.626066	1.8471	3.7593	4.2249
A JAN.17 (OH)	Y:	-0.0009	+0.00000	+14.3676	+0.03194	+0.000133	+0.0013
				5.421305	3.0783	5.9149	6.0394
JAN.17 (OH)	X:	-0.0006	+0.00000	+36.9077	+0.06971	+0.000400	+0.0033
(2448273.5)				0.294866	4.9927	0.6328	3.8599
A FEV. 2 (OH)	Y:	-0.0008	+0.00000	+14.0454	+0.02789	+0.000162	+0.0012
				2.095725	6.1064	2.6591	5.6638
FEV.17 (OH)	X:	-0.0006	+0.00000	+37.2952	+0.06384	+0.000462	+0.0034
(2448304.5)				2.877734	1.7242	3.5270	2.7393
A MAR. 5 (OH)	Y:	-0.0008	+0.00000	+13.6362	+0.01787	+0.000211	+0.0012
				4.690673	2.6441	5.2731	4.5561
MAR. 1 (OH)	X:	-0.0006	+0.00000	+37.6644	+0.06243	+0.000490	+0.0035
(2448316.5)				5.097097	4.1339	5.8552	0.8936
A MAR.17 (OH)	Y:	-0.0008	+0.00000	+13.5645	+0.01374	+0.000227	+0.0012
				0.631553	5.0584	1.2030	2.7291
MAR.17 (OH)	X:	-0.0006	+0.00000	+38.3326	+0.06208	+0.000524	+0.0036
(2448332.5)				1.777303	1.0874	2.7140	0.5479
A AVR. 2 (OH)	Y:	-0.0008	+0.00000	+13.5528	+0.00952	+0.000246	+0.0013
				3.600829	2.2865	4.1671	2.3728
AVR. 1 (OH)	X:	-0.0006	+0.00000	+39.1237	+0.06335	+0.000558	+0.0038
(2448347.5)				1.419112	0.9922	2.5296	6.1193
A AVR.17 (OH)	Y:	-0.0009	+0.00000	+13.6362	+0.01012	+0.000259	+0.0013
				3.247396	2.7076	3.8197	1.6644
AVR.17 (OH)	X:	-0.0006	+0.00000	+40.1102	+0.06645	+0.000583	+0.0040
(2448363.5)				4.394369	4.2487	5.7356	5.7745
A MAI 3 (OH)	Y:	-0.0009	+0.00000	+13.8309	+0.01573	+0.000257	+0.0014
				6.226501	6.1855	0.5586	1.3348
MAI 1 (OH)	X:	-0.0006	+0.00000	+41.0562	+0.07008	+0.000615	+0.0041
(2448377.5)				0.720314	0.8098	2.2894	4.7243
A MAI 17 (OH)	Y:	-0.0010	+0.00000	+14.0921	+0.02197	+0.000246	+0.0014
				2.554447	2.7129	3.2429	0.2765
MAI 17 (OH)	X:	-0.0006	+0.00000	+42.1726	+0.07456	+0.000641	+0.0044
(2448393.5)				3.708942	4.0607	5.5910	4.4233
A JUN. 2 (OH)	Y:	-0.0011	+0.00000	+14.4877	+0.02913	+0.000203	+0.0015
				5.543548	5.8331	0.1400	6.2305
JUN. 1 (OH)	X:	-0.0006	+0.00000	+43.1804	+0.07808	+0.000682	+0.0046
(2448408.5)				3.375557	3.9656	5.5755	3.7615
A JUN.17 (OH)	Y:	-0.0011	+0.00000	+14.9360	+0.03457	+0.000156	+0.0016
				5.208768	5.5865	0.1891	5.5637
JUN.17 (OH)	X:	-0.0006	+0.00000	+44.1221	+0.08024	+0.000721	+0.0047
(2448424.5)				0.093821	0.9438	2.6656	3.4492
A JUL. 3 (OH)	Y:	-0.0012	+0.00000	+15.4633	+0.03799	+0.000140	+0.0016
				1.923735	2.3895	4.0497	5.3072
JUL. 1 (OH)	X:	-0.0006	+0.00000	+44.7535	+0.08031	+0.000773	+0.0048
(2448438.5)				2.724070	3.8080	5.6178	2.4541
A JUL.17 (OH)	Y:	-0.0013	+0.00000	+15.9260	+0.03815	+0.000199	+0.0018
				4.549879	5.1030	1.0369	4.2929

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE SATURNE: TETHYS N=3.328

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL.17 (OH)	X:	-0.0005	+0.00000	+45.1776	+0.07809	+0.000813	+0.0049
(2448454.5)				5.732763	0.8247	2.7059	2.1633
A AOU. 2 (OH)	Y:	-0.0013	+0.00000	+16.4007	+0.03464	+0.000298	+0.0017
				1.269859	1.9536	4.4175	3.9752
AOU. 1 (OH)	X:	-0.0005	+0.00000	+45.2379	+0.07457	+0.000847	+0.0049
(2448469.5)				5.412197	0.8014	2.6982	1.5348
A AOU.17 (OH)	Y:	-0.0014	+0.00000	+16.7397	+0.02834	+0.000373	+0.0018
				0.943941	1.8116	4.3001	3.3217
AOU.17 (OH)	X:	-0.0006	+0.00000	+44.9337	+0.07048	+0.000843	+0.0046
(2448485.5)				2.135911	4.1613	6.0183	1.2476
A SEP. 2 (OH)	Y:	-0.0014	+0.00000	+16.9428	+0.02012	+0.000403	+0.0018
				3.945646	5.1684	1.1876	3.0727
SEP. 1 (OH)	X:	-0.0005	+0.00000	+44.3380	+0.06798	+0.000815	+0.0045
(2448500.5)				1.808957	4.1860	5.9568	0.5800
A SEP.17 (OH)	Y:	-0.0014	+0.00000	+16.9637	+0.01507	+0.000392	+0.0017
				3.614875	5.4726	0.9947	2.3997
SEP.17 (OH)	X:	-0.0004	+0.00000	+43.4466	+0.06759	+0.000738	+0.0043
(2448516.5)				4.804748	1.2764	2.9348	0.3241
A OCT. 3 (OH)	Y:	-0.0014	+0.00000	+16.8100	+0.01721	+0.000337	+0.0017
				0.324981	2.9648	4.1271	2.1028
OCT. 1 (OH)	X:	-0.0005	+0.00000	+42.5285	+0.06922	+0.000667	+0.0042
(2448530.5)				1.136415	4.1936	5.7753	5.5104
A OCT.17 (OH)	Y:	-0.0013	+0.00000	+16.5471	+0.02281	+0.000274	+0.0016
				2.939248	5.9696	0.5788	1.0428
OCT.17 (OH)	X:	-0.0004	+0.00000	+41.4133	+0.07203	+0.000566	+0.0038
(2448546.5)				4.117092	1.1954	2.7324	5.2008
A NOV. 2 (OH)	Y:	-0.0012	+0.00000	+16.1350	+0.02909	+0.000191	+0.0015
				5.921229	2.9070	3.7127	0.7195
NOV. 1 (OH)	X:	-0.0004	+0.00000	+40.3844	+0.07465	+0.000489	+0.0036
(2448561.5)				3.762689	1.0819	2.6393	4.4736
A NOV.17 (OH)	Y:	-0.0012	+0.00000	+15.6772	+0.03341	+0.000119	+0.0014
				5.570026	2.6875	3.5560	0.0191
NOV.17 (OH)	X:	-0.0004	+0.00000	+39.3744	+0.07633	+0.000418	+0.0036
(2448577.5)				0.445687	4.2711	5.8990	4.1385
A DEC. 3 (OH)	Y:	-0.0011	+0.00000	+15.1487	+0.03593	+0.000057	+0.0014
				2.258521	5.7510	0.6880	5.9521
DEC. 1 (OH)	X:	-0.0003	+0.00000	+38.6085	+0.07674	+0.000386	+0.0034
(2448591.5)				3.036344	0.7524	2.4807	3.0204
A DEC.17 (OH)	Y:	-0.0010	+0.00000	+14.6775	+0.03661	+0.000040	+0.0013
				4.855699	2.1197	4.4979	4.8471
DEC.17 (OH)	X:	-0.0003	+0.00000	+37.9019	+0.07567	+0.000364	+0.0033
(2448607.5)				5.993001	3.8964	5.7243	2.6712
A JAN. 2 (OH)	Y:	-0.0010	+0.00000	+14.1510	+0.03566	+0.000072	+0.0012
				1.538468	5.1266	1.9025	4.4926

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE SATURNE: DIONE N=2.296

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.1102	-0.00006	+47.3304	+0.11954	+0.000424	+0.0551
(2448257.5)				5.242520	3.5070	5.3042	1.7594
A JAN.17 (OH)	Y:	+0.0508	-0.00007	+18.9062	+0.04892	+0.000157	+0.0218
				0.789322	4.7876	1.3116	3.5959
JAN.17 (OH)	X:	-0.1111	-0.00009	+47.1620	+0.11697	+0.000434	+0.0550
(2448273.5)				4.239536	2.6568	4.5144	6.0498
A FEV. 2 (OH)	Y:	+0.0496	-0.00006	+18.4373	+0.04411	+0.000194	+0.0213
				6.076399	3.8611	0.3791	1.6083
FEV. 1 (OH)	X:	-0.1125	-0.00011	+47.2665	+0.11413	+0.000483	+0.0553
(2448288.5)				0.943869	5.7899	1.4073	5.7511
A FEV.17 (OH)	Y:	+0.0486	-0.00004	+18.0825	+0.03870	+0.000226	+0.0209
				2.791419	0.6503	3.3806	1.3209
FEV.17 (OH)	X:	-0.1147	-0.00011	+47.6534	+0.11018	+0.000518	+0.0560
(2448304.5)				6.227108	4.9589	0.5602	3.7628
A MAR. 5 (OH)	Y:	+0.0477	-0.00001	+17.8034	+0.03221	+0.000257	+0.0207
				1.800824	6.0597	2.3603	5.6229
MAR. 1 (OH)	X:	-0.1162	-0.00015	+48.1232	+0.10739	+0.000544	+0.0566
(2448316.5)				2.337843	1.2057	3.0883	2.2730
A MAR.17 (OH)	Y:	+0.0474	+0.00000	+17.6686	+0.02724	+0.000274	+0.0206
				4.201531	2.3121	4.7430	4.1407
MAR.17 (OH)	X:	-0.1186	-0.00017	+48.9768	+0.10362	+0.000597	+0.0579
(2448332.5)				1.344919	0.4051	2.2705	0.2939
A AVR. 2 (OH)	Y:	+0.0473	+0.00002	+17.5965	+0.02139	+0.000298	+0.0206
				3.216947	1.6238	3.7383	2.1687
AVR. 1 (OH)	X:	-0.1211	-0.00015	+49.9875	+0.10012	+0.000637	+0.0593
(2448347.5)				4.346022	3.6024	5.4417	0.0138
A AVR.17 (OH)	Y:	+0.0476	+0.00005	+17.6499	+0.01844	+0.000313	+0.0208
				6.224725	5.0745	0.4338	1.8944
AVR.17 (OH)	X:	-0.1236	-0.00010	+51.2484	+0.09669	+0.000678	+0.0610
(2448363.5)				3.364585	2.8469	4.6979	4.3300
A MAI 3 (OH)	Y:	+0.0484	+0.00008	+17.8424	+0.02040	+0.000310	+0.0211
				5.248639	4.6299	5.7685	6.2158
MAI 1 (OH)	X:	-0.1252	-0.00006	+52.4581	+0.09363	+0.000727	+0.0626
(2448377.5)				4.082344	3.7746	5.6465	5.7569
A MAI 17 (OH)	Y:	+0.0495	+0.00011	+18.1280	+0.02536	+0.000295	+0.0216
				5.969233	5.6762	0.2516	1.3613
MAI 17 (OH)	X:	-0.1263	+0.00001	+53.8857	+0.08958	+0.000774	+0.0644
(2448393.5)				3.114258	3.0665	4.9861	3.8051
A JUN. 2 (OH)	Y:	+0.0513	+0.00014	+18.5798	+0.03244	+0.000238	+0.0223
				5.001986	4.9384	5.7379	5.6903
JUN. 1 (OH)	X:	-0.1262	+0.00012	+55.1752	+0.08487	+0.000842	+0.0662
(2448408.5)				6.140177	0.0714	2.0319	3.5509
A JUN.17 (OH)	Y:	+0.0535	+0.00014	+19.1046	+0.03794	+0.000175	+0.0230
				1.743135	1.8156	2.8455	5.4391
JUN.17 (OH)	X:	-0.1245	+0.00023	+56.3799	+0.07857	+0.000889	+0.0676
(2448424.5)				5.185296	5.7175	1.4379	1.6146
A JUL. 3 (OH)	Y:	+0.0559	+0.00016	+19.7295	+0.04110	+0.000145	+0.0238
				0.784249	0.9701	2.8783	3.4900

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE SATURNE: DIONE N=2.296

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL. 1 (OH)	X:	-0.1214	+0.00032	+57.1880	+0.07243	+0.000949	+0.0687
(2448438.5)				5.924841	0.4867	2.4897	3.0601
A JUL.17 (OH)	Y:	+0.0583	+0.00014	+20.2807	+0.04021	+0.000229	+0.0245
				1.518769	1.7956	4.3042	4.9378
JUL.17 (OH)	X:	-0.1163	+0.00041	+57.7314	+0.06565	+0.000991	+0.0691
(2448454.5)				4.977906	6.2464	1.9068	1.1300
A AOU. 2 (OH)	Y:	+0.0608	+0.00013	+20.8445	+0.03443	+0.000361	+0.0252
				0.565038	0.9618	3.7114	2.9935
AOU. 1 (OH)	X:	-0.1102	+0.00047	+57.8100	+0.06181	+0.001022	+0.0691
(2448469.5)				1.734751	3.4602	5.2614	0.8849
A AOU.17 (OH)	Y:	+0.0626	+0.00010	+21.2399	+0.02480	+0.000461	+0.0256
				3.598466	4.1578	0.6428	2.7491
AOU.17 (OH)	X:	-0.1026	+0.00048	+57.4233	+0.06286	+0.001007	+0.0684
(2448485.5)				0.786897	3.0352	4.6338	5.2332
A SEP. 2 (OH)	Y:	+0.0642	+0.00004	+21.4611	+0.01211	+0.000498	+0.0257
				2.644115	3.6568	6.1268	0.8027
SEP. 1 (OH)	X:	-0.0952	+0.00048	+56.6637	+0.06928	+0.000975	+0.0672
(2448500.5)				3.821328	0.2334	1.6560	4.9791
A SEP.17 (OH)	Y:	+0.0649	-0.00001	+21.4520	+0.00940	+0.000486	+0.0256
				5.673600	1.9356	2.9988	0.5486
SEP.17 (OH)	X:	-0.0877	+0.00042	+55.5268	+0.07980	+0.000881	+0.0658
(2448516.5)				2.863103	5.9546	0.9640	3.0296
A OCT. 3 (OH)	Y:	+0.0647	-0.00005	+21.2170	+0.02180	+0.000414	+0.0251
				4.711822	1.6539	2.1613	4.8773
OCT. 1 (OH)	X:	-0.0819	+0.00035	+54.3559	+0.09013	+0.000797	+0.0641
(2448530.5)				3.589201	0.6706	1.9218	4.4545
A OCT.17 (OH)	Y:	+0.0640	-0.00008	+20.8459	+0.03257	+0.000337	+0.0246
				5.436503	2.5590	2.9847	0.0208
OCT.17 (OH)	X:	-0.0764	+0.00025	+52.9340	+0.10085	+0.000673	+0.0624
(2448546.5)				2.616245	6.2363	1.2022	2.4866
A NOV. 2 (OH)	Y:	+0.0625	-0.00011	+20.2781	+0.04256	+0.000228	+0.0238
				4.463993	1.7036	2.1375	4.3360
NOV. 1 (OH)	X:	-0.0724	+0.00016	+51.6225	+0.10907	+0.000597	+0.0607
(2448561.5)				5.623923	3.1553	4.4777	2.2032
A NOV.17 (OH)	Y:	+0.0607	-0.00011	+19.6527	+0.04891	+0.000142	+0.0231
				1.190889	4.7868	5.3060	4.0572
NOV.17 (OH)	X:	-0.0696	+0.00009	+50.3356	+0.11490	+0.000498	+0.0593
(2448577.5)				4.636452	2.3525	3.7433	0.2216
A DEC. 3 (OH)	Y:	+0.0588	-0.00013	+18.9330	+0.05276	+0.000057	+0.0221
				0.208069	3.8657	4.6490	2.0783
DEC. 1 (OH)	X:	-0.0680	+0.00002	+49.3612	+0.11827	+0.000459	+0.0581
(2448591.5)				5.338327	3.1974	4.7250	1.6209
A DEC.17 (OH)	Y:	+0.0568	-0.00012	+18.2917	+0.05393	+0.000032	+0.0213
				0.915627	4.6137	0.6888	3.4882
DEC.17 (OH)	X:	-0.0674	+0.00000	+48.4637	+0.11946	+0.000414	+0.0571
(2448607.5)				4.340955	2.3564	3.9898	5.9139
A JAN. 2 (OH)	Y:	+0.0547	-0.00013	+17.5731	+0.05306	+0.000082	+0.0205
				6.209678	3.6637	0.4847	1.5024

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 DE SATURNE: RHEA N=1.391

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.0496	+0.00024	+66.0991	+0.15683	+0.000607	+0.0313
(2448257.5)				5.916872	4.1704	5.9161	4.9786
A JAN.17 (OH)	Y:	-0.0416	+0.00001	+26.7310	+0.06521	+0.000221	+0.0125
				1.458016	5.4190	1.8782	0.5243
JAN.17 (OH)	X:	-0.0457	+0.00022	+65.8623	+0.15458	+0.000621	+0.0311
(2448273.5)				3.002612	1.4177	3.2150	5.4773
A FEV. 2 (OH)	Y:	-0.0413	+0.00001	+26.0808	+0.05869	+0.000268	+0.0122
				4.836115	2.5686	5.3439	1.0331
FEV. 1 (OH)	X:	-0.0425	+0.00022	+66.0063	+0.15162	+0.000664	+0.0311
(2448288.5)				4.983378	3.5527	5.3676	3.1942
A FEV.17 (OH)	Y:	-0.0412	+0.00000	+25.5909	+0.05137	+0.000311	+0.0119
				0.542693	4.6615	1.0619	5.0397
FEV.17 (OH)	X:	-0.0391	+0.00017	+66.5436	+0.14790	+0.000705	+0.0311
(2448304.5)				2.071497	0.8166	2.6471	3.6937
A MAR. 5 (OH)	Y:	-0.0412	-0.00001	+25.2087	+0.04261	+0.000352	+0.0117
				3.923675	1.8882	4.4476	5.5517
MAR. 1 (OH)	X:	-0.0370	+0.00015	+67.1998	+0.14490	+0.000759	+0.0313
(2448316.5)				6.172845	5.0546	0.5911	5.6396
A MAR.17 (OH)	Y:	-0.0414	-0.00002	+25.0272	+0.03595	+0.000383	+0.0115
				1.748866	6.1402	2.2557	1.2209
MAR.17 (OH)	X:	-0.0345	+0.00012	+68.3898	+0.14088	+0.000817	+0.0316
(2448332.5)				3.267450	2.3463	4.1611	6.1481
A AVR. 2 (OH)	Y:	-0.0417	-0.00003	+24.9365	+0.02814	+0.000414	+0.0114
				5.135326	3.5641	5.6286	1.7358
AVR. 1 (OH)	X:	-0.0329	+0.00007	+69.7998	+0.13727	+0.000896	+0.0321
(2448347.5)				5.260851	4.5355	0.0674	3.8774
A AVR.17 (OH)	Y:	-0.0423	-0.00004	+25.0213	+0.02480	+0.000439	+0.0114
				0.852476	6.0352	1.3433	5.7532
AVR.17 (OH)	X:	-0.0316	+0.00002	+71.5594	+0.13330	+0.000961	+0.0325
(2448363.5)				2.366594	1.8700	3.6977	4.3897
A MAI 3 (OH)	Y:	-0.0431	-0.00006	+25.3019	+0.02832	+0.000436	+0.0115
				4.247031	3.6812	4.7691	6.2724
MAI 1 (OH)	X:	-0.0315	-0.00001	+73.2474	+0.12963	+0.001035	+0.0329
(2448377.5)				2.981393	2.6979	4.5382	5.6302
A MAI 17 (OH)	Y:	-0.0441	-0.00007	+25.7111	+0.03578	+0.000416	+0.0116
				4.864862	4.6137	5.4519	1.2314
MAI 17 (OH)	X:	-0.0318	-0.00011	+75.2398	+0.12505	+0.001118	+0.0338
(2448393.5)				0.100465	0.0831	1.9687	6.1552
A JUN. 2 (OH)	Y:	-0.0454	-0.00007	+26.3538	+0.04589	+0.000342	+0.0119
				1.984954	1.9553	2.7562	1.7553
JUN. 1 (OH)	X:	-0.0336	-0.00012	+77.0402	+0.11957	+0.001205	+0.0342
(2448408.5)				2.118594	2.3727	4.2740	3.8955
A JUN.17 (OH)	Y:	-0.0468	-0.00008	+27.0961	+0.05385	+0.000254	+0.0121
				4.001619	4.1084	5.1678	5.7755
JUN.17 (OH)	X:	-0.0357	-0.00022	+78.7218	+0.11309	+0.001281	+0.0347
(2448424.5)				5.534381	6.1128	1.7569	4.4373
A JUL. 3 (OH)	Y:	-0.0481	-0.00007	+27.9774	+0.05836	+0.000231	+0.0125
				1.130297	1.3542	3.2127	0.0327

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 DE SATURNE: RHEA N=1.391

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JUL. 1 (OH)	X:	-0.0384	-0.00022	+79.8504	+0.10713	+0.001362	+0.0352
(2448438.5)				6.171512	0.7793	2.6997	5.6916
A JUL.17 (OH)	Y:	-0.0494	-0.00004	+28.7522	+0.05735	+0.000340	+0.0128
				1.762403	2.0883	4.4857	1.2780
JUL.17 (OH)	X:	-0.0424	-0.00021	+80.6103	+0.10080	+0.001399	+0.0355
(2448454.5)				3.312671	4.6080	0.1918	6.2160
A AOU. 2 (OH)	Y:	-0.0503	-0.00004	+29.5423	+0.04964	+0.000513	+0.0131
				5.179942	5.6465	1.9901	1.7977
AOU. 1 (OH)	X:	-0.0451	-0.00019	+80.7203	+0.09783	+0.001428	+0.0354
(2448469.5)				5.346025	0.7682	2.5553	3.9763
A AOU.17 (OH)	Y:	-0.0509	+0.00000	+30.0935	+0.03705	+0.000648	+0.0133
				0.923493	1.5890	4.2108	5.8379
AOU.17 (OH)	X:	-0.0485	-0.00012	+80.1810	+0.09852	+0.001398	+0.0357
(2448485.5)				2.487027	4.6483	0.0223	4.5132
A SEP. 2 (OH)	Y:	-0.0509	+0.00003	+30.3976	+0.02142	+0.000696	+0.0136
				4.341146	5.5016	1.5159	0.0794
SEP. 1 (OH)	X:	-0.0499	-0.00006	+79.1215	+0.10414	+0.001349	+0.0354
(2448500.5)				4.515477	0.7973	2.3437	2.2579
A SEP.17 (OH)	Y:	-0.0505	+0.00007	+30.3782	+0.01747	+0.000676	+0.0136
				0.081483	2.3675	3.6736	4.1069
SEP.17 (OH)	X:	-0.0512	+0.00002	+77.5341	+0.11349	+0.001236	+0.0349
(2448516.5)				1.646768	4.5962	6.0392	2.7960
A OCT. 3 (OH)	Y:	-0.0494	+0.00007	+30.0407	+0.03121	+0.000575	+0.0136
				3.492431	0.2317	0.9432	4.6411
OCT. 1 (OH)	X:	-0.0507	+0.00007	+75.8990	+0.12329	+0.001127	+0.0345
(2448530.5)				2.272185	5.5063	0.6129	4.0403
A OCT.17 (OH)	Y:	-0.0483	+0.00009	+29.5138	+0.04496	+0.000469	+0.0134
				4.116499	1.0957	1.6923	5.8856
OCT.17 (OH)	X:	-0.0497	+0.00016	+73.9134	+0.13429	+0.000978	+0.0339
(2448546.5)				5.672290	2.8991	4.2827	4.5521
A NOV. 2 (OH)	Y:	-0.0469	+0.00009	+28.7107	+0.05792	+0.000328	+0.0131
				1.233998	4.6489	5.2514	0.1141
NOV. 1 (OH)	X:	-0.0473	+0.00017	+72.0806	+0.14290	+0.000861	+0.0332
(2448561.5)				1.391496	5.1198	0.2437	2.2874
A NOV.17 (OH)	Y:	-0.0455	+0.00009	+27.8289	+0.06644	+0.000202	+0.0127
				3.238998	0.4659	1.1585	4.1386
NOV.17 (OH)	X:	-0.0445	+0.00023	+70.2832	+0.14961	+0.000748	+0.0327
(2448577.5)				4.777088	2.4260	3.8908	2.7944
A DEC. 3 (OH)	Y:	-0.0441	+0.00009	+26.8162	+0.07147	+0.000098	+0.0124
				0.346301	3.9301	4.9916	4.6493
DEC. 1 (OH)	X:	-0.0415	+0.00025	+68.9215	+0.15360	+0.000684	+0.0322
(2448591.5)				5.378296	3.1872	4.7414	4.0199
A DEC.17 (OH)	Y:	-0.0429	+0.00008	+25.9147	+0.07302	+0.000067	+0.0120
				0.953483	4.5873	0.4623	5.8804
DEC.17 (OH)	X:	-0.0375	+0.00024	+67.6666	+0.15533	+0.000623	+0.0316
(2448607.5)				2.470472	0.4516	2.0826	4.5229
A JAN. 2 (OH)	Y:	-0.0416	+0.00007	+24.9066	+0.07175	+0.000115	+0.0115
				4.337453	1.7345	4.6653	0.1126

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 6 DE SATURNE: TITAN N=0.394

		AO	A1	BO FO	B1 F1	CO PO
JAN. 1 (OH) (2448257.5)	X:	+ 2.1360	- 0.99056	+147.7851 2.417599	+ 0.86021 2.1142	+1.8539 4.0158
A JAN.12 (OH)	Y:	- 2.3283	+ 0.04520	+ 59.5322 4.225054	+ 0.06915 2.6676	+0.7714 5.9373
JAN.12 (OH) (2448268.5)	X:	+ 1.1427	- 0.87547	+152.6627 0.387135	+ 0.58314 3.0965	+2.0151 0.4919
A JAN.23 (OH)	Y:	- 3.5025	+ 0.27208	+ 60.7252 2.239466	+ 0.34692 5.6649	+0.7245 2.2786
JAN.23 (OH) (2448279.5)	X:	+ 0.3938	- 0.74523	+156.5064 4.745150	+ 0.97786 2.9579	+2.5195 2.6187
A FEV. 3 (OH)	Y:	- 4.0025	+ 0.37679	+ 58.5270 0.331385	+ 0.38159 5.2748	+0.9765 4.5524
FEV. 1 (OH) (2448288.5)	X:	- 0.4064	- 0.35054	+150.2846 1.986948	+ 0.59213 1.3221	+1.9082 3.3296
A FEV.12 (OH)	Y:	- 0.2752	- 0.30929	+ 58.0067 3.853163	+ 0.33668 2.4622	+0.6543 5.2390
FEV.12 (OH) (2448299.5)	X:	+ 1.9048	- 0.81383	+154.4943 6.252374	+ 0.45993 2.6659	+2.0123 5.9881
A FEV.23 (OH)	Y:	- 1.3413	- 0.13020	+ 56.2869 1.848390	+ 0.05878 3.6416	+0.8036 1.5253
FEV.23 (OH) (2448310.5)	X:	+ 3.0745	- 1.03676	+160.3319 4.339913	+ 1.15308 2.6420	+2.6501 1.8517
A MAR. 6 (OH)	Y:	- 2.0638	- 0.00893	+ 56.8308 6.180741	+ 0.17049 4.1325	+0.8865 3.7123
MAR. 1 (OH) (2448316.5)	X:	+ 1.3269	- 0.82379	+155.9750 0.354669	+ 0.43350 2.9119	+2.0535 0.5055
A MAR.12 (OH)	Y:	- 3.5459	+ 0.28202	+ 57.8426 2.230871	+ 0.28568 5.6974	+0.6837 2.3312
MAR.12 (OH) (2448327.5)	X:	+ 0.5506	- 0.70794	+161.0041 4.715100	+ 0.86803 3.1594	+2.6036 2.6584
A MAR.23 (OH)	Y:	- 4.0826	+ 0.38593	+ 56.2489 0.329284	+ 0.38586 5.4994	+0.9506 4.6131
MAR.23 (OH) (2448338.5)	X:	- 1.1944	- 0.39995	+157.3009 2.739316	+ 0.62418 2.7031	+2.1237 4.9062
A AVR. 3 (OH)	Y:	- 3.9591	+ 0.37213	+ 53.8185 4.592343	+ 0.29303 5.5299	+0.7618 0.4176
AVR. 1 (OH) (2448347.5)	X:	+ 2.6615	- 0.89535	+162.8000 6.234414	+ 0.48450 2.3024	+2.1173 6.0384
A AVR.12 (OH)	Y:	- 1.6818	- 0.07990	+ 55.8028 1.855091	+ 0.07250 2.9347	+0.7848 1.5839
AVR.12 (OH) (2448358.5)	X:	+ 3.9866	- 1.17376	+170.4174 4.334817	+ 1.11280 2.7553	+2.8583 1.9126
A AVR.23 (OH)	Y:	- 2.4548	+ 0.04267	+ 56.8153 6.200238	+ 0.14097 4.9058	+0.9009 3.8047
AVR.23 (OH) (2448369.5)	X:	+ 3.6187	- 1.15927	+161.0680 2.370024	+ 1.28012 2.4870	+2.0919 4.1157
A MAI 4 (OH)	Y:	- 3.1485	+ 0.16867	+ 55.8415 4.224655	+ 0.21471 4.8317	+0.7745 6.0469

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 6 DE SATURNE: TITAN N=0.394

		A0	A1	B0 F0	B1 F1	C0 P0
MAI 1 (OH)	X:	- 8.7462	+ 1.14865	+163.4290	+ 1.27155	+2.7497
(2448377.5)				5.517729	5.6638	4.4851
A MAI 12 (OH)	Y:	- 0.4869	- 0.22909	+ 56.1898	+ 0.25507	+0.8577
				1.087169	1.8321	0.0923
MAI 12 (OH)	X:	- 7.8421	+ 1.02460	+173.1522	+ 0.75569	+2.6809
(2448388.5)				3.512003	5.5762	0.2554
A MAI 23 (OH)	Y:	+ 0.0320	- 0.34724	+ 60.4934	+ 0.20094	+0.9649
				5.412136	2.3862	2.1955
MAI 23 (OH)	X:	- 4.2225	+ 0.41768	+177.6566	+ 0.47249	+2.1406
(2448399.5)				1.609596	0.6667	2.8155
A JUN. 3 (OH)	Y:	+ 0.1320	- 0.39741	+ 59.9028	+ 0.41287	+0.6808
				3.524318	2.7890	4.6205
JUN. 1 (OH)	X:	- 8.6826	+ 0.95781	+172.3675	+ 1.13425	+2.8457
(2448408.5)				5.160847	5.4653	3.7731
A JUN.12 (OH)	Y:	- 2.9239	+ 0.19878	+ 60.7848	+ 0.28150	+0.9877
				0.768200	0.2790	5.5702
JUN.12 (OH)	X:	- 9.8897	+ 1.19829	+182.4417	+ 1.06310	+2.8593
(2448419.5)				3.163762	5.3067	5.8506
A JUN.23 (OH)	Y:	- 2.1081	+ 0.05115	+ 61.9538	+ 0.18653	+0.9154
				5.077729	6.0708	1.4926
JUN.23 (OH)	X:	- 8.7520	+ 1.07304	+189.0309	+ 0.70273	+2.0726
(2448430.5)				1.287242	5.8962	2.1793
A JUL. 4 (OH)	Y:	- 0.9392	- 0.18253	+ 63.5884	+ 0.23495	+0.7757
				3.165745	2.6727	3.9879
JUL. 1 (OH)	X:	+ 4.2749	- 1.36281	+191.9167	+ 0.91425	+3.2515
(2448438.5)				4.451954	2.6440	2.1487
A JUL.12 (OH)	Y:	- 3.5364	+ 0.19298	+ 64.7073	+ 0.23043	+1.0643
				0.042643	5.7376	4.0627
JUL.12 (OH)	X:	+ 2.0219	- 1.05951	+180.9122	+ 1.07452	+2.3456
(2448449.5)				2.507578	2.9762	4.4109
A JUL.23 (OH)	Y:	- 4.3454	+ 0.35200	+ 63.7358	+ 0.42355	+0.9132
				4.345237	5.3307	6.2531
JUL.23 (OH)	X:	- 0.6616	- 0.60628	+187.4998	+ 0.78052	+2.4738
(2448460.5)				0.539439	2.7268	0.8352
A AOU. 3 (OH)	Y:	- 4.5916	+ 0.41189	+ 69.0343	+ 0.28598	+0.8111
				2.401405	5.3870	2.7139
AOU. 1 (OH)	X:	+ 2.1026	- 0.86740	+191.8419	+ 0.58832	+3.1293
(2448469.5)				4.135388	1.9735	1.4969
A AOU.12 (OH)	Y:	- 0.8322	- 0.29861	+ 68.9608	+ 0.22877	+1.0943
				5.962392	2.6016	3.2717
AOU.12 (OH)	X:	+ 2.5005	- 1.04778	+180.2466	+ 0.87780	+2.3342
(2448480.5)				2.196664	2.7380	3.7476
A AOU.23 (OH)	Y:	- 2.2562	- 0.04823	+ 67.8017	+ 0.12936	+0.8660
				4.045346	4.2676	5.6863
AOU.23 (OH)	X:	+ 3.5007	- 1.28493	+185.4650	+ 1.38227	+2.4537
(2448491.5)				0.203639	2.5576	0.2547
A SEP. 3 (OH)	Y:	- 3.4520	+ 0.16233	+ 69.4493	+ 0.20941	+0.8911
				2.086879	4.7649	2.0055

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 6 DE SATURNE: TITAN N=0.394

		AO	A1	BO FO	B1 F1	CO PO
SEP. 1 (OH) (2448500.5)	X:	- 5.1741	+ 0.45495	+184.0480 3.787622	+ 0.76202 0.0691	+2.7882 0.7430
A SEP.12 (OH)	Y:	+ 0.6049	- 0.49775	+ 70.7752 5.625196	+ 0.47468 2.4294	+1.1336 2.5655
SEP.12 (OH) (2448511.5)	X:	- 2.5080	- 0.06758	+179.9658 1.869604	+ 0.08536 5.8503	+2.2405 3.1879
A SEP.23 (OH)	Y:	- 0.2134	- 0.37176	+ 68.3862 3.742579	+ 0.27342 2.4776	+0.7660 5.0349
SEP.23 (OH) (2448522.5)	X:	+ 1.4664	- 0.78285	+178.8019 6.170835	+ 0.95567 2.3942	+2.3847 5.8098
A OCT. 4 (OH)	Y:	- 0.8533	- 0.28444	+ 65.6017 1.754784	+ 0.25785 3.2695	+0.9869 1.3618
OCT. 1 (OH) (2448530.5)	X:	- 7.5532	+ 0.62492	+176.2548 3.047497	+ 0.78711 5.6045	+2.5711 5.5142
A OCT.12 (OH)	Y:	- 3.5122	+ 0.30396	+ 64.7632 4.909795	+ 0.23816 0.1300	+0.8948 1.0485
OCT.12 (OH) (2448541.5)	X:	- 9.2647	+ 0.96897	+178.0099 1.142817	+ 1.04319 5.2437	+1.9391 1.7942
A OCT.23 (OH)	Y:	- 2.4682	+ 0.12505	+ 65.9539 2.965209	+ 0.27344 0.0547	+0.8018 3.6821
OCT.23 (OH) (2448552.5)	X:	- 9.9770	+ 1.20701	+162.9044 5.472893	+ 0.73879 5.6171	+2.7326 4.3018
A NOV. 3 (OH)	Y:	- 1.0416	- 0.12499	+ 62.7354 1.010806	+ 0.08201 2.9491	+0.9551 6.1088
NOV. 1 (OH) (2448561.5)	X:	- 0.8139	- 0.54537	+164.1448 2.718922	+ 0.24352 2.5711	+2.1206 4.7991
A NOV.12 (OH)	Y:	- 4.1475	+ 0.38282	+ 60.3826 4.543572	+ 0.24429 6.0628	+0.8358 0.3001
NOV.12 (OH) (2448572.5)	X:	- 4.0651	+ 0.02055	+165.7717 0.748880	+ 0.59173 4.3618	+2.0561 1.1188
A NOV.23 (OH)	Y:	- 4.0879	+ 0.39992	+ 62.9201 2.577036	+ 0.49974 5.8534	+0.7280 3.0681
NOV.23 (OH) (2448583.5)	X:	- 6.3575	+ 0.49228	+158.0783 5.079880	+ 0.32165 4.4432	+2.4963 3.4994
A DEC. 4 (OH)	Y:	- 3.4562	+ 0.31547	+ 59.7150 0.672533	+ 0.29258 5.3774	+0.9780 5.3112
DEC. 1 (OH) (2448591.5)	X:	- 0.5696	- 0.28431	+157.4122 1.937131	+ 0.35495 0.8277	+1.9769 3.3085
A DEC.12 (OH)	Y:	- 0.3748	- 0.30024	+ 58.6381 3.816468	+ 0.30278 2.1626	+0.6569 5.2217
DEC.12 (OH) (2448602.5)	X:	+ 2.4015	- 0.85191	+158.7235 6.207675	+ 0.75916 2.7741	+2.0452 5.9650
A DEC.23 (OH)	Y:	- 1.3701	- 0.13668	+ 55.9771 1.814726	+ 0.13625 4.3340	+0.7955 1.5140
DEC.23 (OH) (2448613.5)	X:	+ 3.3336	- 1.02414	+161.1766 4.298579	+ 1.21965 2.4189	+2.6376 1.8316
A JAN. 3 (OH)	Y:	- 2.0935	+ 0.00079	+ 55.4412 6.150333	+ 0.22856 3.7231	+0.8572 3.7053

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 7 DE SATURNE: HYPERION N=0.394

		A0	A1	B0 F0	B1 F1	C0 P0
JAN. 1 (0H) (2448257.5)	X:	+ 3.6306	+ 5.95699	+155.5360 5.213927	+10.92573 3.1962	+0.0945 2.6548
A JAN. 9 (0H)	Y:	+17.3592	- 1.75533	+ 63.3987 0.712435	+ 4.58676 4.9140	+0.1535 4.0116
JAN. 9 (0H) (2448265.5)	X:	+62.1190	- 5.61055	+141.1412 1.186434	+ 9.41073 5.8600	+0.6650 3.7056
A JAN.17 (0H)	Y:	+ 1.7734	- 2.45404	+ 52.6742 3.228301	+ 4.08102 1.7305	+0.0866 4.3916
JAN.17 (0H) (2448273.5)	X:	-21.7317	+ 1.80799	+162.6916 3.541917	+ 8.92050 1.6181	+2.0031 2.7193
A JAN.25 (0H)	Y:	- 8.2401	+ 4.06111	+ 49.4276 5.467062	+ 2.00885 3.8016	+0.7926 4.9849
JAN.25 (0H) (2448281.5)	X:	+25.1304	+ 3.46524	+154.8881 6.039275	+12.50316 4.1661	+0.5318 4.3460
A FEV. 2 (0H)	Y:	+13.9561	- 2.10804	+ 55.2607 1.548980	+ 4.25946 5.9245	+0.1358 5.6950
FEV. 1 (0H) (2448288.5)	X:	+72.0671	-11.93099	+121.8485 1.554558	+ 4.90358 0.0963	+1.6118 4.2866
A FEV. 9 (0H)	Y:	-10.1973	+ 0.13819	+ 55.5102 3.541105	+ 3.36267 1.9076	+0.5487 0.4335
FEV. 9 (0H) (2448296.5)	X:	-43.0487	+ 9.41379	+160.2624 3.874600	+ 8.99851 1.6324	+0.6092 4.5733
A FEV.17 (0H)	Y:	+ 7.5198	+ 1.38968	+ 58.5067 5.946314	+ 3.32617 3.9433	+0.4055 5.7515
FEV.17 (0H) (2448304.5)	X:	+35.3711	+ 1.93178	+155.3672 0.216996	+12.95667 4.7226	+0.5357 5.0802
A FEV.25 (0H)	Y:	+11.3943	- 2.27508	+ 51.0956 2.062158	+ 4.01848 0.2981	+0.0927 0.8203
FEV.25 (0H) (2448312.5)	X:	+22.0947	- 6.30055	+152.7583 2.462962	+ 8.41647 0.7491	+2.6985 0.3592
A MAR. 5 (0H)	Y:	-14.6744	+ 2.80829	+ 54.0975 4.210779	+ 2.69502 2.3218	+0.9331 2.0866
MAR. 1 (0H) (2448316.5)	X:	-32.6079	+ 4.19556	+168.6539 3.547264	+ 9.25447 1.5030	+1.4447 2.9970
A MAR. 9 (0H)	Y:	- 4.2286	+ 3.56639	+ 48.9456 5.554700	+ 2.09891 3.7965	+0.7074 5.2807
MAR. 9 (0H) (2448324.5)	X:	+25.4286	+ 3.49634	+158.1691 6.095719	+13.00347 4.2610	+0.5725 4.5390
A MAR.17 (0H)	Y:	+13.9585	- 2.08494	+ 52.4469 1.629964	+ 4.09850 6.0527	+0.1219 6.0255
MAR.17 (0H) (2448332.5)	X:	+51.7930	-10.94392	+135.6443 1.982898	+ 5.92182 0.4416	+1.9736 5.5556
A MAR.25 (0H)	Y:	-16.7691	+ 2.53772	+ 55.3295 3.758008	+ 2.77115 1.8431	+0.9352 1.1268
MAR.25 (0H) (2448340.5)	X:	-32.4045	+ 9.52212	+162.3057 4.301743	+ 9.93279 2.1304	+0.5264 5.8244
A AVR. 2 (0H)	Y:	+16.3166	- 0.57606	+ 62.1057 6.270933	+ 4.24213 4.1606	+0.0126 3.5394

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 7 DE SATURNE: HYPERION N=0.394

		AO	A1	BO FO	B1 F1	CO PO
AVR. 1 (OH)	X:	+35.8677	+ 2.11132	+161.9162	+13.56995	+0.5150
(2448347.5)				0.272648	4.8221	5.3258
A AVR. 9 (OH)	Y:	+11.6124	- 2.31361	+ 49.9719	+ 3.95233	+0.0855
				2.137318	0.4269	1.3430
AVR. 9 (OH)	X:	+19.0690	- 6.26447	+163.6931	+ 9.13196	+3.0386
(2448355.5)				2.530079	0.8102	0.6556
A AVR.17 (OH)	Y:	-12.1614	+ 2.58623	+ 54.7433	+ 2.84023	+0.9838
				4.318505	2.4691	2.4533
AVR.17 (OH)	X:	-10.2149	+ 7.31494	+167.8691	+11.78225	+0.1424
(2448363.5)				4.895260	2.8697	1.7921
A AVR.25 (OH)	Y:	+18.0861	- 1.32565	+ 60.8014	+ 4.50394	+0.1574
				0.478035	4.6980	4.0162
AVR.25 (OH)	X:	+58.9687	- 3.30177	+162.2946	+11.59684	+0.5566
(2448371.5)				0.929559	5.6201	3.4896
A MAI 3 (OH)	Y:	+ 7.1917	- 2.91844	+ 48.2384	+ 3.76469	+0.1714
				2.979236	1.5532	4.0121
MAI 1 (OH)	X:	+15.9126	- 6.66555	+168.3611	+ 9.36447	+3.1653
(2448377.5)				2.743726	1.0676	1.2072
A MAI 9 (OH)	Y:	-10.8661	+ 2.77861	+ 55.2073	+ 2.82478	+0.9895
				4.527218	2.7048	2.9897
MAI 9 (OH)	X:	- 3.7805	+ 6.85447	+173.9391	+12.75421	+0.2575
(2448385.5)				5.110353	3.1297	2.8217
A MAI 17 (OH)	Y:	+18.4462	- 1.50735	+ 61.1442	+ 4.63643	+0.1787
				0.675583	4.9347	4.4115
MAI 17 (OH)	X:	+71.1548	- 6.85043	+162.4005	+ 9.83461	+1.2675
(2448393.5)				1.040767	5.7463	3.6828
A MAI 25 (OH)	Y:	+ 4.2110	- 2.62553	+ 51.4167	+ 3.84854	+0.1701
				3.150824	1.7407	5.0454
MAI 25 (OH)	X:	-33.3904	+ 2.91307	+193.3467	+10.56864	+1.8141
(2448401.5)				3.418281	1.4080	2.8897
A JUN. 2 (OH)	Y:	- 5.5973	+ 4.16012	+ 51.1059	+ 2.00500	+0.7620
				5.385179	3.6263	5.2198
JUN. 1 (OH)	X:	+11.6980	+ 5.68007	+178.8485	+14.15088	+0.5215
(2448408.5)				5.644570	3.7642	3.9583
A JUN. 9 (OH)	Y:	+18.0602	- 1.98621	+ 59.8630	+ 4.67753	+0.1737
				1.176612	5.5355	5.2978
JUN. 9 (OH)	X:	+84.0627	-14.45718	+148.5398	+ 5.10014	+2.3279
(2448416.5)				1.426850	6.1416	4.4353
A JUN.17 (OH)	Y:	-10.7966	+ 0.58519	+ 61.1617	+ 3.45643	+0.8021
				3.438587	1.7617	0.4816
JUN.17 (OH)	X:	-52.6585	+10.73571	+196.4708	+11.65493	+0.6612
(2448424.5)				3.814440	1.5692	5.0413
A JUN.25 (OH)	Y:	+11.7241	+ 1.16486	+ 66.4229	+ 3.99825	+0.3119
				5.882603	3.8445	5.8241
JUN.25 (OH)	X:	+33.8302	+ 3.31069	+183.6478	+15.32245	+0.5781
(2448432.5)				0.164443	4.7178	5.2790
A JUL. 3 (OH)	Y:	+14.6925	- 2.54125	+ 57.5686	+ 4.56664	+0.1012
				2.001161	0.2879	1.1453

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 7 DE SATURNE: HYPERION N=0.394

		A0	A1	B0 F0	B1 F1	C0 P0
JUL. 1 (OH)	X:	+73.9800	-14.20593	+154.2515	+ 5.57784	+2.3818
(2448438.5)				1.688034	0.1303	5.0360
A JUL. 9 (OH)	Y:	-16.2778	+ 2.11100	+ 65.4940	+ 3.40485	+1.0857
				3.555788	1.7129	0.8238
JUL. 9 (OH)	X:	-46.1734	+10.96521	+195.0275	+11.84858	+0.7111
(2448446.5)				4.056485	1.8352	5.6281
A JUL.17 (OH)	Y:	+17.2978	+ 0.05407	+ 72.4588	+ 4.77300	+0.0965
				6.063485	3.9750	6.0040
JUL.17 (OH)	X:	+38.5728	+ 2.81238	+185.7204	+15.43209	+0.4913
(2448454.5)				0.371408	4.9659	5.6455
A JUL.25 (OH)	Y:	+14.4549	- 2.85943	+ 58.4215	+ 4.58963	+0.1022
				2.214031	0.5680	2.0938
JUL.25 (OH)	X:	+21.3168	- 7.56143	+185.4727	+10.09699	+3.5320
(2448462.5)				2.657127	0.9626	1.0551
A AOU. 2 (OH)	Y:	-12.2872	+ 2.96671	+ 65.5995	+ 3.41121	+1.2114
				4.423588	2.5954	2.8180
AOU. 1 (OH)	X:	-19.6482	+ 8.44164	+191.3971	+13.00462	+0.2614
(2448469.5)				4.691210	2.6170	0.8081
A AOU. 9 (OH)	Y:	+21.8060	- 1.25058	+ 74.1587	+ 5.40785	+0.1680
				0.273377	4.4756	3.7188
AOU. 9 (OH)	X:	+55.4100	- 0.81747	+183.2041	+13.94627	+0.2260
(2448477.5)				0.812068	5.4840	3.4334
A AOU.17 (OH)	Y:	+12.4202	- 3.68385	+ 56.5100	+ 4.36405	+0.2298
				2.764733	1.3202	3.6611
AOU.17 (OH)	X:	+ 1.0331	- 5.44349	+188.7262	+10.24468	+3.2847
(2448485.5)				3.193680	1.4771	2.2793
A AOU.25 (OH)	Y:	-14.0047	+ 5.00412	+ 57.7249	+ 2.07811	+0.8877
				4.918292	3.1127	4.3092
AOU.25 (OH)	X:	+ 7.9896	+ 6.18521	+183.8924	+14.33073	+0.4863
(2448493.5)				5.588891	3.6834	3.7547
A SEP. 2 (OH)	Y:	+20.8270	- 2.02238	+ 68.2593	+ 5.31586	+0.2121
				1.093988	5.4280	5.1081
SEP. 1 (OH)	X:	+82.0975	- 9.78936	+163.8880	+ 8.37512	+1.8132
(2448500.5)				1.130954	5.8057	3.8756
A SEP. 9 (OH)	Y:	+ 2.5311	- 2.59428	+ 61.1408	+ 4.25461	+0.2999
				3.227870	1.7839	5.8516
SEP. 9 (OH)	X:	-43.3574	+ 5.73053	+199.7795	+11.19545	+1.1713
(2448508.5)				3.514374	1.3729	3.2954
A SEP.17 (OH)	Y:	- 2.4125	+ 4.06919	+ 61.0516	+ 2.67719	+0.7636
				5.509729	3.6311	5.4459
SEP.17 (OH)	X:	+21.7338	+ 4.71347	+177.7642	+14.58740	+0.6049
(2448516.5)				6.101336	4.2882	4.6205
A SEP.25 (OH)	Y:	+19.0231	- 2.45575	+ 63.0806	+ 4.95284	+0.1426
				1.599116	6.0446	6.0524
SEP.25 (OH)	X:	+52.4523	-11.03518	+158.6663	+ 7.23272	+2.5722
(2448524.5)				1.993346	0.3344	5.8217
A OCT. 3 (OH)	Y:	-17.6864	+ 2.77314	+ 67.3225	+ 3.44174	+1.1870
				3.744556	1.8048	1.2909

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 7 DE SATURNE: HYPERION N=0.394

		AO	A1	BO FO	B1 F1	CO PO
OCT. 1 (OH)	X:	-49.9215	+ 8.50452	+191.7161	+11.26681	+0.6011
(2448530.5)				3.664704	1.4325	4.2705
A OCT. 9 (OH)	Y:	+ 5.0754	+ 2.62720	+ 65.2199	+ 3.48394	+0.5178
				5.707330	3.7114	5.6915
OCT. 9 (OH)	X:	+25.2601	+ 4.09452	+170.9969	+14.19384	+0.5753
(2448538.5)				0.005665	4.5141	4.9330
A OCT.17 (OH)	Y:	+17.9376	- 2.55507	+ 59.5565	+ 4.66600	+0.1035
				1.794264	0.0081	0.2424
OCT.17 (OH)	X:	+35.5708	- 8.51011	+163.1522	+ 8.48146	+2.9069
(2448546.5)				2.215356	0.4909	0.0942
A OCT.25 (OH)	Y:	-15.3212	+ 2.66574	+ 64.1385	+ 3.32782	+1.1332
				3.961243	2.0428	1.8117
OCT.25 (OH)	X:	-24.7119	+ 7.91526	+171.5212	+11.58758	+0.3010
(2448554.5)				4.564098	2.4624	0.6140
A NOV. 2 (OH)	Y:	+19.2540	- 0.70526	+ 69.3455	+ 5.03228	+0.1456
				0.168902	4.3584	3.5940
NOV. 1 (OH)	X:	+35.0106	+ 2.47447	+163.8022	+13.53032	+0.3552
(2448561.5)				0.460495	5.0688	5.6896
A NOV. 9 (OH)	Y:	+15.6039	- 3.07079	+ 52.9431	+ 4.03463	+0.0940
				2.297322	0.6826	2.8246
NOV. 9 (OH)	X:	+19.3861	- 7.76586	+157.9731	+ 8.56349	+2.9117
(2448569.5)				2.758232	1.0964	1.3963
A NOV.17 (OH)	Y:	-11.9883	+ 2.94783	+ 58.2829	+ 2.91949	+0.9774
				4.487217	2.6158	3.1030
NOV.17 (OH)	X:	- 9.5747	+ 6.54446	+161.4001	+11.97577	+0.3018
(2448577.5)				5.103085	3.1196	2.7138
A NOV.25 (OH)	Y:	+18.8685	- 1.11468	+ 62.6455	+ 4.81990	+0.2058
				0.659334	4.9236	4.4697
NOV.25 (OH)	X:	+66.4896	- 6.77348	+148.5426	+ 8.49193	+1.3765
(2448585.5)				0.996950	5.6451	3.8116
A DEC. 3 (OH)	Y:	+ 6.4652	- 2.87374	+ 50.6319	+ 3.57155	+0.2035
				3.099024	1.6721	5.5020
DEC. 1 (OH)	X:	+12.3770	- 7.34832	+153.3971	+ 8.32569	+2.7706
(2448591.5)				2.945260	1.2969	1.8905
A DEC. 9 (OH)	Y:	-12.5302	+ 3.60872	+ 51.8744	+ 2.23499	+0.7455
				4.642301	2.7357	3.6829
DEC. 9 (OH)	X:	- 6.4209	+ 6.19054	+154.6194	+11.79864	+0.3442
(2448599.5)				5.284446	3.3506	3.2546
A DEC.17 (OH)	Y:	+18.0779	- 1.21200	+ 57.8954	+ 4.52037	+0.1998
				0.836033	5.1376	4.7774
DEC.17 (OH)	X:	+71.0275	- 9.68575	+139.1046	+ 6.42016	+1.8280
(2448607.5)				1.087013	5.6761	4.0540
A DEC.25 (OH)	Y:	+ 1.0381	- 1.72997	+ 50.9926	+ 3.25707	+0.3998
				3.209163	1.6850	0.0360
DEC.25 (OH)	X:	-42.9341	+ 5.37212	+172.3646	+10.35724	+0.5294
(2448615.5)				3.495558	1.3298	3.5209
A JAN. 2 (OH)	Y:	+ 0.6957	+ 2.77667	+ 51.0675	+ 2.57559	+0.4425
				5.526207	3.5434	5.5755

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 8 DE SATURNE: JAPET N=0.079

		A0	A1	B0 F0	C0 P0
JAN. 1 (0H) (2448257.5)	X:	-16.6718	+ 0.65000	+454.3149 2.141148	+ 7.7846 3.9183
A JAN.18 (0H)	Y:	+ 2.7894	- 0.32232	+ 69.8916 4.402402	+ 2.8977 6.0170
JAN.17 (0H) (2448273.5)	X:	-34.5964	+ 0.08245	+434.3320 3.331567	+ 8.5536 5.3734
A FEV. 3 (0H)	Y:	- 8.0075	+ 0.10145	+ 58.1079 5.666203	+ 1.0937 1.3385
FEV. 1 (0H) (2448288.5)	X:	-46.7627	+ 1.88832	+422.8817 4.452352	+ 4.8366 1.2163
A FEV.18 (0H)	Y:	-23.4020	+ 2.98245	+ 54.2534 1.423251	+ 6.2277 4.9330
FEV.17 (0H) (2448304.5)	X:	-24.0371	+ 1.23917	+432.3184 5.754933	+ 9.2443 3.6412
A MAR. 6 (0H)	Y:	+10.2075	- 0.36133	+ 42.8181 1.637372	+ 1.0833 1.0697
MAR. 1 (0H) (2448316.5)	X:	+15.6105	- 2.11198	+468.5427 0.311879	+ 2.7199 0.5250
A MAR.18 (0H)	Y:	+15.6038	- 1.60931	+ 20.8397 2.648314	+ 3.8640 2.1683
MAR.17 (0H) (2448332.5)	X:	+ 5.9933	- 3.20048	+436.9391 1.533632	+ 9.4812 2.1443
A AVR. 3 (0H)	Y:	-14.4207	+ 1.28841	+ 52.3633 3.319286	+ 4.8513 4.7099
AVR. 1 (0H) (2448347.5)	X:	-19.7117	- 1.18828	+456.8089 2.806197	+ 3.1638 5.3151
A AVR.18 (0H)	Y:	- 5.8885	+ 0.48846	+ 36.6592 4.809374	+ 1.3479 5.9151
AVR.17 (0H) (2448363.5)	X:	-19.7084	- 0.15704	+490.4101 4.065220	+10.5678 1.1366
A MAI 4 (0H)	Y:	+ 9.2782	- 1.63819	+ 70.6933 6.026862	+ 5.3934 2.2907
MAI 1 (0H) (2448377.5)	X:	- 8.8454	+ 1.12497	+496.3645 5.113747	+ 7.1289 2.8572
A MAI 18 (0H)	Y:	- 2.3436	- 0.20641	+ 48.0497 0.892010	+ 2.0961 3.5821
MAI 17 (0H) (2448393.5)	X:	- 4.3658	- 0.46694	+515.1503 0.124248	+10.7917 5.2918
A JUN. 3 (0H)	Y:	+ 5.1607	- 0.75450	+ 31.4783 2.130074	+ 2.2915 1.2964
JUN. 1 (0H) (2448408.5)	X:	-18.0369	- 1.18689	+524.8978 1.303460	+ 9.4746 1.1484
A JUN.18 (0H)	Y:	+16.6660	- 2.46705	+ 36.6149 4.507526	+ 7.0809 1.9976
JUN.17 (0H) (2448424.5)	X:	-45.4222	+ 2.61239	+584.0816 2.611619	+ 6.6447 4.6250
A JUL. 4 (0H)	Y:	- 7.6981	+ 1.29377	+ 42.0349 4.257561	+ 2.2378 4.7830

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 8 DE SATURNE: JAPET N=0.079

		AO	A1	BO FO	CO PO
JUL. 1 (OH)	X:	-20.1700	+ 1.62178	+566.0939	+ 6.2519
(2448438.5)				3.705566	6.1666
A JUL.18 (OH)	Y:	+10.4895	- 0.23332	+ 57.6250	+ 0.9860
				5.674609	1.1465
JUL.17 (OH)	X:	-10.1902	+ 0.07976	+551.9908	+ 5.6921
(2448454.5)				5.016882	3.2718
A AOU. 3 (OH)	Y:	+21.6475	- 3.02417	+ 84.1261	+ 5.4058
				0.174967	1.9177
AOU. 1 (OH)	X:	-31.4997	+ 0.24627	+543.6776	+13.2649
(2448469.5)				6.256777	5.2529
A AOU.18 (OH)	Y:	-12.9672	+ 1.12427	+ 80.6799	+ 2.5667
				2.147313	5.8610
AOU.17 (OH)	X:	-37.1856	+ 1.39751	+549.6272	+10.6455
(2448485.5)				1.283208	1.1188
A SEP. 3 (OH)	Y:	+14.1610	- 1.36135	+ 57.0559	+ 4.7982
				3.759483	1.8402
SEP. 1 (OH)	X:	-12.4148	+ 0.54816	+541.0254	+ 8.9208
(2448500.5)				2.466035	3.4827
A SEP.18 (OH)	Y:	+14.1364	- 1.59541	+ 84.1128	+ 3.0649
				4.872786	1.8932
SEP.17 (OH)	X:	-10.5144	+ 0.08913	+528.1608	+ 8.8532
(2448516.5)				3.723863	5.6288
A OCT. 4 (OH)	Y:	- 8.3381	+ 1.35604	+ 42.7024	+ 3.2874
				5.902304	5.4724
OCT. 1 (OH)	X:	-27.4589	- 0.24603	+504.7324	+ 2.7810
(2448530.5)				4.847318	1.8542
A OCT.18 (OH)	Y:	+ 4.8067	+ 0.03898	+ 58.8459	+ 1.9646
				0.678031	0.2527
OCT.17 (OH)	X:	-57.5146	+ 3.08447	+451.6110	+11.2223
(2448546.5)				6.168099	4.9238
A NOV. 3 (OH)	Y:	+ 7.8692	- 0.49962	+ 53.9041	+ 2.2303
				1.907807	1.6751
NOV. 1 (OH)	X:	-33.9806	+ 2.61654	+483.2234	+ 4.0682
(2448561.5)				1.078806	0.6515
A NOV.18 (OH)	Y:	- 8.8716	+ 1.76201	+ 88.4197	+ 5.0525
				2.970149	4.9006
NOV.17 (OH)	X:	-12.3856	+ 1.05558	+486.1599	+ 9.6694
(2448577.5)				2.266762	3.9136
A DEC. 4 (OH)	Y:	+13.7838	- 1.74426	+ 71.1513	+ 2.9040
				4.784368	1.1143
DEC. 1 (OH)	X:	-11.6611	- 1.52346	+437.8592	+ 6.3055
(2448591.5)				3.356648	5.2516
A DEC.18 (OH)	Y:	- 6.6936	- 0.19786	+ 51.8477	+ 1.0559
				5.599344	1.4241
DEC.17 (OH)	X:	-42.4477	+ 0.93485	+433.7584	+ 4.4992
(2448607.5)				4.544068	1.2801
A JAN. 3 (OH)	Y:	-24.1355	+ 3.01006	+ 47.7936	+ 6.1301
				1.626508	5.0487

SATELLITES D'URANUS

SATELLITES OF URANUS

DONNÉES SUR LES SATELLITES D'URANUS

DATA ON THE SATELLITES OF URANUS

NOM	masse	rayon	période rotation sidérale	albédo géométrique	magnitude visuelle	période orbitale	élongation maximale	1/2 grand axe	excentricité	inclinaison sur l'équateur d'Uranus
unité →	masse d'Uranus	km	jour			jour	(")	10^3 km		degré
I Ariel	1.49×10^{-5}	580		0.40	14.4	2.520 379 05	14	190.945	0.001 78	0.071
II Umbriel	1.45×10^{-5}	595		0.19	15.3	4.144 176 46	20	265.998	0.004 33	0.128
III Titania	3.97×10^{-5}	805		0.28	14.0	8.705 866 94	33	436.298	0.002 15	0.047
IV Oberon	3.45×10^{-5}	775	(S)	0.24	14.2	13.463 234 20	44	583.519	0.001 56	0.117
V Miranda	0.075×10^{-5}	242		0.34	16.5	1.413 479 41	10	129.872	0.001 52	4.339
NAME	*mass*	*radius*	*sidereal rotation*	*geometrical albedo*	*visual magnitude*	*orbital period*	*greatest elongation*	*semi major axis*	*eccentricity*	*inclination on Uranus' equator*
unit →	*Uranus' mass*	*km*	*day*			*day*	*(")*	*10^3 km*		*degree*

NOTES

(S) : rotation synchrone

Données extraites de *Science* (vol. 233, 1986, p. 41) pour les valeurs des rayons et des albédos, et de *Astronomy and Astrophysics* (vol. 188, 1987, p. 212 : GUST86, J. Laskar et R.A. Jacobson) pour les autres données.

(S) synchronous rotation

Data from Science (vol. 233, 1986, P. 41) for the values of the radii and the albedoes, and from Astronomy and Astrophysics (vol. 188, 1987, p. 212 : GUST86, J. Laskar and R.A. Jacobson) for the other data.

ÉPHÉMÉRIDES DES CINQ PREMIERS SATELLITES D'URANUS

EPHEMERIDES OF THE FIRST FIVE SATELLITES OF URANUS

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000.

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000.

$$\Delta\alpha \cos\delta = X$$
$$\Delta\delta = Y$$

$$\left.\begin{matrix} X \\ Y \end{matrix}\right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of the beginning of the interval and T the date for the calculation

satellite	intervalle Δt (jours)	N (rad/j)	page
Miranda	9	4.488 0	86
Ariel	31	2.493 0	89
Umbriel	27	1.516 2	90
Titiana	17	0.721 7	91
Obéron	27	0.466 7	93
	(days)	*(rad/d)*	

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA N=4.4880

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	+0.0085	-0.00035	+ 7.8179	+0.34212	+0.007158	+0.0053
(2448257.5)				4.683090	3.0954	1.3230	3.1617
A JAN.10 (OH)	Y:	-0.0145	-0.00022	+ 8.7041	+0.38122	+0.007999	+0.0057
				6.194041	4.6210	2.8578	4.6888
JAN.10 (OH)	X:	+0.0064	+0.00012	+ 7.7798	+0.34130	+0.007281	+0.0045
(2448266.5)				0.704684	5.4071	3.6177	1.3734
A JAN.19 (OH)	Y:	-0.0121	-0.00062	+ 8.7125	+0.38100	+0.007999	+0.0066
				2.215609	0.6458	5.1669	3.0666
JAN.19 (OH)	X:	+0.0047	+0.00037	+ 7.7549	+0.33790	+0.007096	+0.0050
(2448275.5)				3.009558	1.4290	5.9520	6.1602
A JAN.28 (OH)	Y:	-0.0160	+0.00029	+ 8.7296	+0.38042	+0.008018	+0.0063
				4.520886	2.9549	1.2037	1.2317
JAN.28 (OH)	X:	+0.0057	+0.00003	+ 7.7380	+0.33751	+0.007029	+0.0049
(2448284.5)				5.315559	3.7368	1.9657	4.4375
A FEV. 6 (OH)	Y:	-0.0178	+0.00053	+ 8.7556	+0.38221	+0.008052	+0.0060
				0.544072	5.2640	3.4977	5.8808
FEV. 6 (OH)	X:	+0.0091	-0.00064	+ 7.7283	+0.33675	+0.007087	+0.0053
(2448293.5)				1.338774	6.0491	4.2773	2.9264
A FEV.15 (OH)	Y:	-0.0155	-0.00010	+ 8.7907	+0.38126	+0.008100	+0.0062
				2.850533	1.2920	5.6331	4.0565
FEV.15 (OH)	X:	+0.0073	-0.00012	+ 7.7312	+0.33565	+0.006967	+0.0053
(2448302.5)				3.645798	2.0732	0.3156	1.0513
A FEV.24 (OH)	Y:	-0.0136	-0.00043	+ 8.8365	+0.38312	+0.008025	+0.0056
				5.158309	3.5993	1.8522	2.5703
FEV.24 (OH)	X:	+0.0040	+0.00051	+ 7.7402	+0.33532	+0.007077	+0.0057
(2448311.5)				5.953461	4.3878	2.6374	5.7239
A MAR. 5 (OH)	Y:	-0.0139	-0.00028	+ 8.8864	+0.38659	+0.008125	+0.0055
				1.183807	5.9111	4.1420	0.7964
MAR. 5 (OH)	X:	+0.0053	+0.00008	+ 7.7610	+0.33561	+0.007031	+0.0057
(2448320.5)				1.978581	0.4149	4.9497	3.9338
A MAR.14 (OH)	Y:	-0.0177	+0.00048	+ 8.9457	+0.38617	+0.008096	+0.0055
				3.492353	1.9378	0.1998	5.5823
MAR.14 (OH)	X:	+0.0071	-0.00034	+ 7.7907	+0.33765	+0.007036	+0.0052
(2448329.5)				4.287934	2.7258	0.9622	2.2455
A MAR.23 (OH)	Y:	-0.0183	+0.00040	+ 9.0104	+0.38890	+0.008150	+0.0060
				5.802075	4.2485	2.5063	3.8990
MAR.23 (OH)	X:	+0.0080	-0.00038	+ 7.8261	+0.33777	+0.007170	+0.0055
(2448338.5)				0.314009	5.0423	3.2954	0.5088
A AVR. 1 (OH)	Y:	-0.0139	-0.00061	+ 9.0781	+0.39141	+0.008184	+0.0058
				1.828995	0.2766	4.8177	2.3364
AVR. 1 (OH)	X:	+0.0055	+0.00016	+ 7.8747	+0.33966	+0.007078	+0.0049
(2448347.5)				2.624195	1.0677	5.6025	5.2206
A AVR.10 (OH)	Y:	-0.0141	-0.00041	+ 9.1505	+0.39363	+0.008222	+0.0065
				4.139580	2.5867	0.8496	0.5161
AVR.10 (OH)	X:	+0.0030	+0.00055	+ 7.9282	+0.34207	+0.007065	+0.0050
(2448356.5)				4.934976	3.3789	1.6297	3.5714
A AVR.19 (OH)	Y:	-0.0172	+0.00027	+ 9.2195	+0.39686	+0.008511	+0.0067
				0.167493	4.9030	3.1614	5.1374
AVR.19 (OH)	X:	+0.0062	-0.00024	+ 7.9861	+0.34317	+0.007168	+0.0049
(2448365.5)				0.962417	5.6935	3.9599	1.9780
A AVR.28 (OH)	Y:	-0.0187	+0.00039	+ 9.2935	+0.39953	+0.008406	+0.0068
				2.478718	0.9271	5.4692	3.4387
AVR.28 (OH)	X:	+0.0082	-0.00055	+ 8.0492	+0.34631	+0.007320	+0.0055
(2448374.5)				3.273762	1.7241	6.2657	0.3785
A MAI 7 (OH)	Y:	-0.0175	+0.00000	+ 9.3655	+0.40321	+0.008438	+0.0064
				4.790501	3.2359	1.4844	1.6415

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA N=4.4880

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
MAI 7 (OH)	X:	+0.0057	+0.00009	+ 8.1155	+0.34820	+0.007308	+0.0053
(2448383.5)				5.584995	4.0348	2.3086	4.9870
A MAI 16 (OH)	Y:	-0.0138	-0.00071	+ 9.4284	+0.40580	+0.008622	+0.0066
				0.818889	5.5496	3.7990	0.0186
MAI 16 (OH)	X:	+0.0037	+0.00037	+ 8.1833	+0.35167	+0.007400	+0.0059
(2448392.5)				1.613398	0.0628	4.6086	3.2573
A MAI 25 (OH)	Y:	-0.0158	-0.00017	+ 9.4914	+0.40842	+0.008559	+0.0061
				3.130517	1.5728	6.1031	4.6257
MAI 25 (OH)	X:	+0.0038	+0.00021	+ 8.2473	+0.35583	+0.007624	+0.0061
(2448401.5)				3.925112	2.3766	0.6231	1.5146
A JUN. 3 (OH)	Y:	-0.0204	+0.00068	+ 9.5450	+0.40969	+0.008593	+0.0058
				5.442042	3.8816	2.1449	3.0822
JUN. 3 (OH)	X:	+0.0068	-0.00043	+ 8.3117	+0.35781	+0.007516	+0.0058
(2448410.5)				6.236175	4.6825	2.9411	6.1585
A JUN.12 (OH)	Y:	-0.0185	+0.00008	+ 9.5876	+0.41215	+0.008682	+0.0059
				1.470246	6.1915	4.4456	1.3772
JUN.12 (OH)	X:	+0.0076	-0.00047	+ 8.3704	+0.36054	+0.007626	+0.0058
(2448419.5)				2.263980	0.7083	5.2477	4.3067
A JUN.21 (OH)	Y:	-0.0157	-0.00051	+ 9.6205	+0.41503	+0.008863	+0.0063
				3.781519	2.2184	0.4548	6.1655
JUN.21 (OH)	X:	+0.0030	+0.00049	+ 8.4197	+0.36345	+0.007686	+0.0055
(2448428.5)				4.574668	3.0162	1.2671	2.7321
A JUN.30 (OH)	Y:	-0.0156	-0.00036	+ 9.6427	+0.41463	+0.008831	+0.0064
				6.091996	4.5253	2.7842	4.3960
JUN.30 (OH)	X:	+0.0025	+0.00040	+ 8.4609	+0.36588	+0.007711	+0.0056
(2448437.5)				0.601602	5.3220	3.5660	1.0398
A JUL. 9 (OH)	Y:	-0.0183	+0.00019	+ 9.6541	+0.41712	+0.008835	+0.0066
				2.119293	0.5479	5.0676	2.7398
JUL. 9 (OH)	X:	+0.0056	-0.00033	+ 8.4899	+0.36628	+0.007906	+0.0048
(2448446.5)				2.910909	1.3485	5.8934	5.7962
A JUL.18 (OH)	Y:	-0.0210	+0.00063	+ 9.6517	+0.41847	+0.008911	+0.0073
				4.429171	2.8548	1.0803	0.9620
JUL.18 (OH)	X:	+0.0063	-0.00038	+ 8.5095	+0.36881	+0.007818	+0.0055
(2448455.5)				5.220004	3.6503	1.8943	4.0471
A JUL.27 (OH)	Y:	-0.0173	-0.00025	+ 9.6380	+0.41732	+0.008790	+0.0063
				0.454883	5.1584	3.3969	5.5705
JUL.27 (OH)	X:	+0.0049	-0.00002	+ 8.5149	+0.37079	+0.007915	+0.0053
(2448464.5)				1.245180	5.9557	4.1805	2.5675
A AOU. 5 (OH)	Y:	-0.0143	-0.00075	+ 9.6109	+0.41692	+0.008930	+0.0070
				2.763175	1.1831	5.6996	3.7585
AOU. 5 (OH)	X:	+0.0015	+0.00054	+ 8.5074	+0.36964	+0.007973	+0.0059
(2448473.5)				3.552330	1.9775	0.2217	0.7815
A AOU.14 (OH)	Y:	-0.0180	+0.00017	+ 9.5747	+0.41587	+0.008796	+0.0060
				5.070835	3.4854	1.7199	2.1165
AOU.14 (OH)	X:	+0.0025	+0.00019	+ 8.4896	+0.37075	+0.007897	+0.0056
(2448482.5)				5.859179	4.2779	2.5032	5.3806
A AOU.23 (OH)	Y:	-0.0200	+0.00049	+ 9.5268	+0.41566	+0.008776	+0.0064
				1.094815	5.7894	4.0038	0.4854
AOU.23 (OH)	X:	+0.0065	-0.00065	+ 8.4586	+0.36955	+0.007869	+0.0065
(2448491.5)				1.881749	0.2967	4.8095	3.6260
A SEP. 1 (OH)	Y:	-0.0187	+0.00010	+ 9.4681	+0.41302	+0.008969	+0.0050
				3.400788	1.8156	0.0435	5.1071
SEP. 1 (OH)	X:	+0.0046	-0.00014	+ 8.4164	+0.36822	+0.007852	+0.0055
(2448500.5)				4.186874	2.5983	0.8272	1.8735
A SEP.10 (OH)	Y:	-0.0160	-0.00043	+ 9.4092	+0.41149	+0.008675	+0.0062
				5.706366	4.1136	2.3359	3.4801

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA N=4.4880

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
SEP.10 (OH)	X:	+0.0015	+0.00049	+ 8.3618	+0.36725	+0.007978	+0.0061
(2448509.5)				0.208100	4.9036	3.1185	0.1455
A SEP.19 (OH)	Y:	-0.0149	-0.00048	+ 9.3414	+0.40992	+0.008659	+0.0055
				1.728092	0.1345	4.6309	1.9101
SEP.19 (OH)	X:	+0.0017	+0.00025	+ 8.3030	+0.36399	+0.007782	+0.0053
(2448518.5)				2.511604	0.9185	5.4296	4.7034
A SEP.28 (OH)	Y:	-0.0193	+0.00051	+ 9.2697	+0.40633	+0.008696	+0.0062
				4.031971	2.4401	0.6649	0.2073
SEP.28 (OH)	X:	+0.0034	-0.00016	+ 8.2366	+0.36297	+0.007704	+0.0053
(2448527.5)				4.815195	3.2182	1.4263	3.1444
A OCT. 7 (OH)	Y:	-0.0200	+0.00051	+ 9.1990	+0.40460	+0.008589	+0.0060
				0.052506	4.7416	2.9574	4.7183
OCT. 7 (OH)	X:	+0.0052	-0.00047	+ 8.1616	+0.36012	+0.007782	+0.0045
(2448536.5)				0.834597	5.5235	3.7290	1.3974
A OCT.16 (OH)	Y:	-0.0157	-0.00043	+ 9.1265	+0.40059	+0.008531	+0.0066
				2.355304	0.7626	5.2777	3.0589
OCT.16 (OH)	X:	+0.0027	+0.00014	+ 8.0886	+0.35634	+0.007539	+0.0052
(2448545.5)				3.136753	1.5371	6.0352	6.1518
A OCT.25 (OH)	Y:	-0.0152	-0.00037	+ 9.0579	+0.39868	+0.008485	+0.0063
				4.658118	3.0653	1.2845	1.2371
OCT.25 (OH)	X:	-0.0004	+0.00067	+ 8.0109	+0.35303	+0.007492	+0.0048
(2448554.5)				5.438764	3.8393	2.0575	4.5014
A NOV. 3 (OH)	Y:	-0.0170	+0.00013	+ 8.9892	+0.39711	+0.008551	+0.0063
				0.677504	5.3716	3.5777	5.8342
NOV. 3 (OH)	X:	+0.0024	-0.00010	+ 7.9322	+0.34962	+0.007454	+0.0052
(2448563.5)				1.457226	6.1422	4.3579	2.8353
A NOV.12 (OH)	Y:	-0.0192	+0.00050	+ 8.9287	+0.39286	+0.008365	+0.0062
				2.979391	1.3901	5.8996	4.0932
NOV.12 (OH)	X:	+0.0044	-0.00044	+ 7.8554	+0.34706	+0.007414	+0.0055
(2448572.5)				3.759128	2.1611	0.3675	1.0470
A NOV.21 (OH)	Y:	-0.0184	+0.00021	+ 8.8758	+0.39141	+0.008249	+0.0054
				5.281905	3.6918	1.9079	2.5061
NOV.21 (OH)	X:	+0.0028	+0.00000	+ 7.7796	+0.34250	+0.007366	+0.0055
(2448581.5)				6.060556	4.4655	2.6908	5.6714
A NOV.30 (OH)	Y:	-0.0141	-0.00060	+ 8.8255	+0.38915	+0.008229	+0.0054
				1.300990	5.9979	4.2153	0.7832
NOV.30 (OH)	X:	+0.0009	+0.00034	+ 7.7106	+0.34026	+0.007225	+0.0055
(2448590.5)				2.079303	0.4827	4.9728	3.8917
A DEC. 9 (OH)	Y:	-0.0154	-0.00014	+ 8.7861	+0.38637	+0.008137	+0.0053
				3.603346	2.0185	0.2453	5.5362
DEC. 9 (OH)	X:	+0.0000	+0.00037	+ 7.6436	+0.33785	+0.007182	+0.0052
(2448599.5)				4.381536	2.7869	0.9865	2.1286
A DEC.18 (OH)	Y:	-0.0193	+0.00065	+ 8.7539	+0.38389	+0.008174	+0.0054
				5.906075	4.3260	2.5664	3.8978
DEC.18 (OH)	X:	+0.0032	-0.00033	+ 7.5825	+0.33371	+0.007060	+0.0053
(2448608.5)				0.400354	5.0907	3.3080	0.4948
A DEC.27 (OH)	Y:	-0.0183	+0.00025	+ 8.7311	+0.38276	+0.008074	+0.0054
				1.926098	0.3479	4.8677	2.1835
DEC.27 (OH)	X:	+0.0043	-0.00045	+ 7.5297	+0.33110	+0.006990	+0.0044
(2448617.5)				2.703095	1.1117	5.6114	5.0797
A JAN. 5 (OH)	Y:	-0.0159	-0.00023	+ 8.7181	+0.38300	+0.008120	+0.0063
				4.230156	2.6552	0.8771	0.4925

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 D'URANUS: ARIEL N=2.4930

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	+0.0307	-0.00002	+11.9029	+0.00723	+0.000083	+0.0111
(2448257.5)				5.541067	3.1219	5.8987	0.2034
A FEV. 1 (OH)	Y:	+0.0055	+0.00001	+12.8061	+0.00589	+0.000102	+0.0100
				0.762098	5.5201	1.2035	1.7167
FEV. 1 (OH)	X:	+0.0305	+0.00000	+11.8107	+0.00294	+0.000089	+0.0099
(2448288.5)				1.132503	5.7580	1.5271	3.8990
A MAR. 4 (OH)	Y:	+0.0065	-0.00004	+12.8967	+0.00681	+0.000077	+0.0115
				2.655779	2.1261	3.2221	5.5504
MAR. 4 (OH)	X:	+0.0295	+0.00005	+11.8827	+0.00484	+0.000085	+0.0097
(2448319.5)				3.012441	2.8417	3.4681	1.4866
A AVR. 4 (OH)	Y:	+0.0060	+0.00000	+13.1422	+0.01017	+0.000043	+0.0120
				4.535403	4.4851	5.3802	2.9452
AVR. 4 (OH)	X:	+0.0310	+0.00000	+12.1025	+0.00946	+0.000047	+0.0105
(2448350.5)				4.898093	5.0408	5.7010	5.1986
A MAI 5 (OH)	Y:	+0.0052	+0.00001	+13.4830	+0.01230	+0.000037	+0.0109
				0.138198	0.2746	2.3986	0.4233
MAI 5 (OH)	X:	+0.0325	+0.00000	+12.4225	+0.01202	+0.000034	+0.0108
(2448381.5)				0.505475	0.7781	3.4194	2.6624
A JUN. 5 (OH)	Y:	+0.0066	-0.00008	+13.8375	+0.01124	+0.000072	+0.0121
				2.028625	2.3416	5.0648	4.1746
JUN. 5 (OH)	X:	+0.0317	+0.00009	+12.7483	+0.01041	+0.000093	+0.0117
(2448412.5)				2.398571	2.7756	5.7864	0.1030
A JUL. 6 (OH)	Y:	+0.0065	-0.00006	+14.1003	+0.00716	+0.000108	+0.0116
				3.921434	4.5088	0.9547	1.7364
JUL. 6 (OH)	X:	+0.0323	+0.00005	+12.9617	+0.00443	+0.000114	+0.0099
(2448443.5)				4.290958	4.8321	1.4324	3.9371
A AOU. 6 (OH)	Y:	+0.0049	+0.00000	+14.1822	+0.00279	+0.000117	+0.0139
				5.813657	1.3798	2.9700	5.4422
AOU. 6 (OH)	X:	+0.0323	+0.00003	+12.9744	+0.00364	+0.000103	+0.0124
(2448474.5)				6.178722	2.9959	3.5106	1.4430
A SEP. 6 (OH)	Y:	+0.0045	+0.00000	+14.0526	+0.00730	+0.000091	+0.0110
				1.418644	4.4752	5.2383	2.8366
SEP. 6 (OH)	X:	+0.0313	+0.00003	+12.7756	+0.00997	+0.000058	+0.0108
(2448505.5)				1.777328	5.2083	5.4093	5.0713
A OCT. 7 (OH)	Y:	+0.0029	+0.00006	+13.7615	+0.01192	+0.000038	+0.0123
				3.300957	0.4021	1.5729	0.4480
OCT. 7 (OH)	X:	+0.0321	-0.00007	+12.4319	+0.01341	+0.000016	+0.0110
(2448536.5)				3.652848	0.8804	1.7392	2.6066
A NOV. 7 (OH)	Y:	+0.0018	+0.00007	+13.3990	+0.01320	+0.000046	+0.0116
				5.176452	2.4600	4.8184	4.1118
NOV. 7 (OH)	X:	+0.0314	-0.00005	+12.0421	+0.01389	+0.000040	+0.0103
(2448567.5)				5.523934	2.8099	5.5121	0.0650
A DEC. 8 (OH)	Y:	+0.0033	-0.00002	+13.0685	+0.01129	+0.000067	+0.0124
				0.763938	4.5308	0.7886	1.6414
DEC. 8 (OH)	X:	+0.0294	+0.00000	+11.6907	+0.01186	+0.000075	+0.0105
(2448598.5)				1.110277	4.7704	1.3857	3.9181
A JAN. 8 (OH)	Y:	+0.0031	+0.00002	+12.8514	+0.00791	+0.000086	+0.0110
				2.633039	0.4465	2.9298	5.2981

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 D'URANUS: UMBRIEL N=1.5162

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	+0.0745	-0.00093	+16.5711	+0.00972	+0.000110	+0.0334
(2448257.5)				0.753066	4.5908	0.8588	3.9533
A JAN.28 (OH)	Y:	+0.0896	-0.00002	+17.8430	+0.00826	+0.000135	+0.0369
				2.277700	0.7395	2.6308	5.4827
JAN.28 (OH)	X:	+0.0474	+0.00039	+16.4493	+0.00618	+0.000137	+0.0281
(2448284.5)				3.961856	2.1515	4.4154	4.0839
A FEV.24 (OH)	Y:	+0.0815	-0.00065	+17.9415	+0.00992	+0.000110	+0.0316
				5.505589	4.7743	6.0882	5.6441
FEV.24 (OH)	X:	+0.0627	+0.00060	+16.4962	+0.00624	+0.000135	+0.0318
(2448311.5)				0.929763	0.2571	1.5088	4.1655
A MAR.23 (OH)	Y:	+0.0612	+0.00086	+16.2052	+0.01347	+0.000055	+0.0351
				2.453125	2.2259	3.0833	5.6957
MAR.23 (OH)	X:	+0.0759	-0.00071	+16.7101	+0.01098	+0.000090	+0.0345
(2448336.5)				4.164850	4.0788	4.8581	4.4772
A AVR.19 (OH)	Y:	+0.0896	+0.00033	+18.5928	+0.01599	+0.000036	+0.0391
				5.688431	5.6770	0.6762	6.0129
AVR.19 (OH)	X:	+0.0506	+0.00024	+17.0578	+0.01497	+0.000018	+0.0293
(2448365.5)				1.120484	1.3035	0.6947	4.6823
A MAI 16 (OH)	Y:	+0.0943	-0.00092	+19.0311	+0.01668	+0.000063	+0.0346
				2.644422	2.7895	5.6553	6.2467
MAI 16 (OH)	X:	+0.0601	+0.00090	+17.4642	+0.01643	+0.000082	+0.0326
(2448392.5)				4.362923	4.5817	1.1224	4.7350
A JUN.12 (OH)	Y:	+0.0677	+0.00042	+19.4331	+0.01288	+0.000102	+0.0353
				5.886434	6.1501	2.4761	6.2810
JUN.12 (OH)	X:	+0.0853	-0.00067	+17.6351	+0.01304	+0.000145	+0.0373
(2448419.5)				1.323816	1.6620	4.5586	5.0289
A JUL. 9 (OH)	Y:	+0.0883	+0.00052	+19.6982	+0.00695	+0.000134	+0.0401
				2.847264	3.4311	5.8793	0.2808
JUL. 9 (OH)	X:	+0.0629	-0.00027	+18.0619	+0.00534	+0.000154	+0.0325
(2448446.5)				4.568033	5.1971	1.6859	5.3103
A AOU. 5 (OH)	Y:	+0.1010	-0.00101	+19.7524	+0.00377	+0.000170	+0.0358
				6.091198	1.8201	3.1435	0.5539
AOU. 5 (OH)	X:	+0.0596	+0.00087	+18.0700	+0.00480	+0.000128	+0.0326
(2448473.5)				1.526299	4.6283	4.8080	5.3201
A SEP. 1 (OH)	Y:	+0.0685	+0.00006	+19.5884	+0.00960	+0.000123	+0.0339
				3.049822	6.0890	0.2497	0.5997
SEP. 1 (OH)	X:	+0.0867	-0.00049	+17.8497	+0.01240	+0.000113	+0.0369
(2448500.5)				4.763602	1.6581	2.4808	5.5429
A SEP.28 (OH)	Y:	+0.0751	+0.00082	+19.2491	+0.01499	+0.000092	+0.0385
				0.004583	3.2010	4.1814	0.8257
SEP.28 (OH)	X:	+0.0682	-0.00061	+17.4632	+0.01732	+0.000044	+0.0330
(2448527.5)				1.714767	5.1152	5.7639	5.8699
A OCT.25 (OH)	Y:	+0.0956	-0.00074	+18.8156	+0.01746	+0.000076	+0.0350
				3.238680	0.3344	2.2055	1.1041
OCT.25 (OH)	X:	+0.0517	+0.00081	+16.9924	+0.01868	+0.000009	+0.0296
(2448554.5)				4.944665	2.1766	5.0325	5.9060
A NOV.21 (OH)	Y:	+0.0678	-0.00025	+18.3924	+0.01738	+0.000120	+0.0316
				0.185241	3.7487	6.2591	1.1416
NOV.21 (OH)	X:	+0.0762	-0.00012	+16.5324	+0.01781	+0.000066	+0.0333
(2448581.5)				1.868717	5.4696	2.0967	6.0565
A DEC.18 (OH)	Y:	+0.0658	+0.00084	+18.0470	+0.01338	+0.000118	+0.0363
				3.412018	0.9515	3.5907	1.3136
DEC.18 (OH)	X:	+0.0680	-0.00077	+16.1466	+0.01479	+0.000112	+0.0319
(2448608.5)				5.115081	2.5206	5.4182	0.1272
A JAN.14 (OH)	Y:	+0.0920	-0.00048	+17.8501	+0.00940	+0.000120	+0.0341
				0.355313	4.6617	0.7620	1.6079

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 D'URANUS: TITANIA N=0.7217

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.0314	-0.00117	+27.1783	+0.01346	+0.000197	+0.0165
(2448257.5)				5.540940	2.8637	5.1120	2.5269
A JAN.18 (OH)	Y:	+0.0385	-0.00049	+29.2556	+0.01284	+0.000241	+0.0180
				0.781670	5.6511	1.9435	4.0222
JAN.18 (OH)	X:	-0.0566	+0.00047	+27.0214	+0.00798	+0.000210	+0.0285
(2448274.5)				5.237763	2.7873	4.8149	1.6665
A FEV. 4 (OH)	Y:	+0.0673	+0.00061	+29.3294	+0.00888	+0.000284	+0.0311
				0.477282	6.0653	0.0508	3.2074
FEV. 4 (OH)	X:	-0.0612	-0.00203	+26.9822	+0.02067	+0.000743	+0.0332
(2448291.5)				4.938203	3.3615	0.0223	1.3470
A FEV.21 (OH)	Y:	+0.0521	+0.00173	+29.5294	+0.01911	+0.000645	+0.0352
				0.176584	5.4087	1.0388	2.8796
FEV.21 (OH)	X:	-0.0870	+0.00007	+27.0313	+0.00750	+0.000169	+0.0354
(2448305.5)				4.634584	4.4215	4.1812	0.6919
A MAR.10 (OH)	Y:	+0.0994	-0.00316	+29.7716	+0.02588	+0.000444	+0.0385
				6.156637	6.2614	4.2232	2.2584
MAR.10 (OH)	X:	-0.1101	-0.00033	+27.2010	+0.01396	+0.000142	+0.0386
(2448325.5)				4.334601	4.2619	4.1903	0.4597
A MAR.27 (OH)	Y:	+0.0346	+0.00070	+30.1735	+0.02262	+0.000173	+0.0435
				5.857071	5.7474	0.0171	1.9774
MAR.27 (OH)	X:	-0.1043	+0.00148	+27.4721	+0.02455	+0.000730	+0.0296
(2448342.5)				4.037551	3.5042	5.6880	0.0219
A AVR.13 (OH)	Y:	+0.0375	-0.00276	+30.5963	+0.03073	+0.000647	+0.0322
				5.559854	5.1738	1.0791	1.5346
AVR.13 (OH)	X:	-0.1121	+0.00282	+27.8142	+0.02883	+0.000477	+0.0294
(2448359.5)				3.738534	4.0776	1.9246	5.6924
A AVR.30 (OH)	Y:	+0.0121	+0.00019	+31.0386	+0.03256	+0.000667	+0.0321
				5.260577	5.6702	3.4055	0.9433
AVR.30 (OH)	X:	-0.0501	-0.00094	+28.2481	+0.02389	+0.000158	+0.0182
(2448376.5)				3.443110	3.6010	4.3992	5.1511
A MAI 17 (OH)	Y:	+0.0076	+0.00014	+31.4951	+0.02575	+0.000206	+0.0210
				4.965559	5.1053	1.0877	0.4132
MAI 17 (OH)	X:	-0.0697	+0.00262	+28.6535	+0.03057	+0.000548	+0.0211
(2448393.5)				3.149104	3.1799	5.6406	3.9302
A JUN. 3 (OH)	Y:	+0.0402	+0.00120	+31.8941	+0.01962	+0.000357	+0.0249
				4.670651	4.8454	0.3233	5.4012
JUN. 3 (OH)	X:	-0.0340	-0.00270	+29.0786	+0.02278	+0.000309	+0.0242
(2448410.5)				2.855239	3.3479	1.1036	3.4676
A JUN.20 (OH)	Y:	+0.0428	+0.00109	+32.1859	+0.02424	+0.000825	+0.0261
				4.376522	5.3487	2.6877	4.9385
JUN.20 (OH)	X:	-0.0612	-0.00009	+29.4012	+0.01624	+0.000273	+0.0316
(2448427.5)				2.562309	2.9154	4.8946	2.6290
A JUL. 7 (OH)	Y:	+0.0856	-0.00060	+32.3682	+0.00969	+0.000287	+0.0352
				4.084129	4.9846	0.4096	4.1542
JUL. 7 (OH)	X:	-0.1002	-0.00003	+29.6046	+0.01536	+0.000330	+0.0413
(2448444.5)				2.268094	3.2557	6.1406	2.3268
A JUL.24 (OH)	Y:	+0.0616	+0.00160	+32.3942	+0.00857	+0.000393	+0.0447
				3.790871	5.3953	0.5095	3.8609
JUL.24 (OH)	X:	-0.0811	-0.00190	+29.6838	+0.00469	+0.000182	+0.0344
(2448461.5)				1.976722	4.0502	5.6294	1.8384
A AOU.10 (OH)	Y:	+0.1076	-0.00581	+32.3252	+0.02247	+0.000443	+0.0393
				3.498367	6.2670	2.9722	3.3629
AOU.10 (OH)	X:	-0.1226	+0.00069	+29.5954	+0.01192	+0.000152	+0.0411
(2448478.5)				1.681445	4.3882	4.8009	1.4143
A AOU.27 (OH)	Y:	+0.0410	+0.00052	+32.0365	+0.01752	+0.000263	+0.0444
				3.204153	6.0800	6.1370	2.9265

1991 COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 D'URANUS: TITANIA N=0.7217

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
AOU.27 (OH) (2448495.5)	X:	-0.0933	-0.00021	+29.3624 1.385268	+0.01842 4.1786	+0.000310 5.5083	+0.0306 1.0968
A SEP.13 (OH)	Y:	+0.0140	-0.00068	+31.6855 2.908023	+0.02547 5.7696	+0.000267 1.2582	+0.0328 2.6061
SEP.13 (OH) (2448512.5)	X:	-0.1027	+0.00383	+29.0228 1.090294	+0.02512 4.5678	+0.000229 3.1732	+0.0237 0.1930
A SEP.30 (OH)	Y:	+0.0357	-0.00184	+31.2923 2.613483	+0.03751 6.1185	+0.000694 3.5363	+0.0252 1.7956
SEP.30 (OH) (2448529.5)	X:	-0.0475	-0.00116	+28.5747 0.790342	+0.02420 4.0466	+0.000284 4.0666	+0.0186 6.0427
A OCT.17 (OH)	Y:	-0.0037	+0.00205	+30.7932 2.312559	+0.02709 5.3537	+0.000368 0.9885	+0.0217 1.2936
OCT.17 (OH) (2448546.5)	X:	-0.0419	+0.00058	+28.1035 0.489680	+0.02963 3.7051	+0.000188 5.4862	+0.0201 4.7436
A NOV. 3 (OH)	Y:	+0.0543	-0.00023	+30.3496 2.012635	+0.02569 5.3101	+0.000172 1.0114	+0.0219 6.2248
NOV. 3 (OH) (2448563.5)	X:	-0.0503	-0.00136	+27.6144 0.190179	+0.03331 3.8737	+0.000508 1.7584	+0.0301 4.2730
A NOV.20 (OH)	Y:	+0.0552	+0.00176	+29.9481 1.713266	+0.03043 5.6662	+0.000669 3.2408	+0.0320 5.7811
NOV.20 (OH) (2448580.5)	X:	-0.0394	-0.00297	+27.1129 6.169128	+0.02047 2.9766	+0.000621 4.2845	+0.0300 3.6540
A DEC. 7 (OH)	Y:	+0.0842	-0.00152	+29.6061 1.408485	+0.01546 4.7239	+0.000440 0.0064	+0.0321 5.1701
DEC. 7 (OH) (2448597.5)	X:	-0.1032	+0.00087	+26.7221 5.866895	+0.02643 3.1046	+0.000220 6.2326	+0.0379 3.2472
A DEC.24 (OH)	Y:	+0.0641	+0.00048	+29.3748 1.105525	+0.01399 4.8694	+0.000238 0.7914	+0.0421 4.7673
DEC.24 (OH) (2448614.5)	X:	-0.0817	-0.00179	+26.3508 5.563928	+0.02032 3.1521	+0.000249 0.9801	+0.0330 2.9510
A JAN.10 (OH)	Y:	+0.0535	-0.00266	+29.2460 0.803306	+0.02023 5.3758	+0.000640 2.3289	+0.0360 4.4479

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DU SATELLITE 4 D'URANUS: OBERON N=0.4667

		A0	A1	B0 F0	B1 F1	B2 F2	C0 P0
JAN. 1 (OH)	X:	-0.1170	+0.00214	+36.3573	+0.01835	+0.000123	+0.0254
(2448257.5)				3.263231	1.0669	4.5459	5.1248
A JAN.28 (OH)	Y:	+0.0051	-0.00184	+39.1308	+0.02185	+0.000411	+0.0284
				4.786906	3.2459	5.6955	0.3370
JAN.28 (OH)	X:	-0.1045	+0.00406	+36.0828	+0.01176	+0.000081	+0.0209
(2448284.5)				3.288194	2.0077	4.6272	5.7660
A FEV.24 (OH)	Y:	-0.0471	-0.00034	+39.3302	+0.02194	+0.000103	+0.0200
				4.810520	4.2774	5.0955	0.9422
FEV.24 (OH)	X:	-0.0359	+0.00211	+36.2156	+0.01494	+0.000113	+0.0064
(2448311.5)				3.314871	2.9285	3.4123	6.1251
A MAR.23 (OH)	Y:	-0.0446	+0.00155	+39.9052	+0.03001	+0.000249	+0.0074
				4.836322	4.8593	3.6492	1.6539
MAR.23 (OH)	X:	+0.0037	-0.00146	+36.7056	+0.02241	+0.000253	+0.0095
(2448338.5)				3.344636	3.4429	2.8988	4.1186
A AVR.19 (OH)	Y:	+0.0079	+0.00161	+40.7749	+0.03435	+0.000229	+0.0106
				4.866403	5.0315	3.6947	5.5343
AVR.19 (OH)	X:	-0.0320	-0.00267	+37.4647	+0.03075	+0.000233	+0.0230
(2448365.5)				3.378491	3.6474	2.6592	4.6401
A MAI 16 (OH)	Y:	+0.0395	+0.00004	+41.7520	+0.03430	+0.000068	+0.0258
				4.901253	5.0483	2.3238	6.2391
MAI 16 (OH)	X:	-0.0896	-0.00095	+38.3573	+0.03436	+0.000110	+0.0303
(2448392.5)				3.416422	3.6927	1.0376	5.3573
A JUN.12 (OH)	Y:	+0.0012	-0.00077	+42.6199	+0.02829	+0.000272	+0.0355
				4.939653	5.0741	1.3908	0.5675
JUN.12 (OH)	X:	-0.0912	+0.00103	+39.1680	+0.02826	+0.000334	+0.0295
(2448419.5)				3.457197	3.7380	0.3565	6.0153
A JUL. 9 (OH)	Y:	-0.0534	-0.00056	+43.1823	+0.01771	+0.000394	+0.0325
				4.979152	5.4666	1.8153	1.2501
JUL. 9 (OH)	X:	-0.0262	+0.00035	+39.6737	+0.01074	+0.000274	+0.0169
(2448446.5)				3.497815	4.2266	0.4403	0.3896
A AOU. 5 (OH)	Y:	-0.0663	+0.00093	+43.3207	+0.00873	+0.000377	+0.0201
				5.020049	0.7613	1.9428	1.9195
AOU. 5 (OH)	X:	+0.0208	-0.00165	+39.7042	+0.01505	+0.000138	+0.0009
(2448473.5)				3.537485	0.2083	0.0384	2.5176
A SEP. 1 (OH)	Y:	-0.0188	+0.00169	+42.9703	+0.02292	+0.000210	+0.0002
				5.060381	1.8373	1.5984	2.1156
SEP. 1 (OH)	X:	-0.0052	-0.00253	+39.2157	+0.03035	+0.000155	+0.0166
(2448500.5)				3.574826	0.5633	5.6979	4.7086
A SEP.28 (OH)	Y:	+0.0399	+0.00028	+42.2290	+0.03677	+0.000169	+0.0174
				5.097996	2.0855	0.1665	6.2745
SEP.28 (OH)	X:	-0.0852	-0.00007	+38.3254	+0.03415	+0.000254	+0.0253
(2448527.5)				3.608930	0.7487	6.1611	5.4418
A OCT.25 (OH)	Y:	+0.0489	-0.00214	+41.2715	+0.04029	+0.000214	+0.0280
				5.131460	2.2154	5.9087	0.5769
OCT.25 (OH)	X:	-0.1250	+0.00311	+37.2774	+0.03411	+0.000196	+0.0264
(2448554.5)				3.638718	0.8122	0.2509	6.0102
A NOV.21 (OH)	Y:	+0.0014	-0.00265	+40.3094	+0.03172	+0.000096	+0.0264
				5.160808	2.3187	4.7975	1.2910
NOV.21 (OH)	X:	-0.0803	+0.00334	+36.2888	+0.03477	+0.000071	+0.0169
(2448581.5)				3.665094	0.8160	2.9324	0.3298
A DEC.18 (OH)	Y:	-0.0427	-0.00056	+39.5428	+0.01766	+0.000285	+0.0178
				5.186692	2.3821	3.8066	1.9134
DEC.18 (OH)	X:	-0.0099	+0.00047	+35.4673	+0.02990	+0.000303	+0.0017
(2448608.5)				3.689538	0.8232	3.1743	0.0782
A JAN.14 (OH)	Y:	-0.0307	+0.00158	+39.1306	+0.00831	+0.000410	+0.0039
				5.211247	2.6205	4.2444	2.4710

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Ces éphémérides donnent les positions des satellites de Mars, des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus pour 1991 avec une précision de 0.01 seconde de degré ('). Elles sont ainsi très utiles aux astronomes pour préparer ou réduire des observations de haute précision ainsi que pour étudier les mouvements des satellites naturels des planètes.

Les positions sont données sous forme de coefficients de fonctions élémentaires dépendant directement du temps. Les calculs sont faciles à programmer sur une calculatrice de poche ou sur un micro-ordinateur.

Cet ouvrage donne aussi une méthode pour effectuer les prédictions des phénomènes des satellites de Jupiter en 1991.

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These ephemerides give the positions of the satellites of Mars, of the galilean satellites of Jupiter, of the First eight satellites of Saturn and of the five satellites of Uranus for 1991 with an accuracy of 0.01 arcsecond (').

Thus, they are very useful to astronomers in order to prepare or reduce precise observations and to study the motions of the natural satellites of the planets.

The positions are given as coefficients of elementary functions depending directly on time. The calculations are easy to program on a pocket calculator or on a micro-computer.

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