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## **Voyager 1 and 2 Spacecraft Trajectory & Magnetic Field Geometry**

### **Dipole Magnetic field - Spacecraft\_trajectory\_Dipole.csv**

The purpose of this documentation is to outline the information contained in the Spacecraft\_trajectory\_Dipole.csv file.

This CSV file contains both time and trajectory coordinate information about the Voyager 1 & 2 flyby of Jupiter. The first four columns, which contain time and spacecraft location, were obtained from Iowa Ephemeris. The data spans from day DOY 62.083 to 65.125 and is given in 60-second time increments. Following the time information is the spacecraft location information followed by the location of the magnetic field equator along the field line that the spacecraft is on as well as the Centrifugal equator location. The field line model is used is a simple dipole approximation with the centrifugal equator location being two-thirds of the difference between the jovigraphic (spin) equator and the magnetic equator at a given meridian or longitude.

### ***Coordinate Information:***

For this document, all coordinates are prescribed in the Right Handed System III coordinate frame, hereafter RHSIII, with latitude given in co-latitude. Thus if the latitudinal location of the magnetic equator is 98 degrees, the magnetic equator lies at 8 degrees **below** the RHSIII spin equator. The radial distances are given as absolute distances from Jupiter's center, thus  $R = \sqrt{X^2 + Y^2 + Z^2}$ .

Column 1: Time in DOY.

Column 2-5: Spacecraft location in RHSIII

Column 6-8: Magnetic equator location given by the field line produces from the spacecraft location in column 2-5 of that given row.

Column 9-11: Centrifugal equator location given by the field line produces from the spacecraft location in column 2-5 of that given row.

### **Dipole Magnetic field - Spacecraft\_trajectory\_vip4\_can.csv**

The purpose of this documentation is to outline the information contained in the Spacecraft\_trajectory\_vip4\_can.csv file.

This CSV file contains both time and trajectory coordinate information about the Voyager 1 & 2 flyby of Jupiter. The first four columns, which contain time and spacecraft location, were obtained from Iowa Ephemeris. The data spans from day DOY 62.083 to 65.125 and is given in 60-second time increments. Following the time information is the spacecraft location information followed by the location of the magnetic field equator along the field line that the spacecraft is on as well as the Centrifugal equator location. The field line model is a combination of the VIP4 model produced by Connerney and the CAN Sheet model by Connerney, Acuna and Ness.

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**Coordinate Information:**

For this document, all coordinates are prescribed in the Right Handed System III coordinate frame, hereafter RHSIII with latitude given in co-latitude. Thus if the latitudinal location of the magnetic equator is 98 degrees, the magnetic equator lies at 8 degrees **below** the RHSIII spin equator. The radial distances are given as absolute distances from Jupiter's center, thus  $R = \sqrt{X^2+Y^2+Z^2}$ .

Column 1: Time in DOY.

Column 2-5: Spacecraft location in RHSIII

Column 6-8: Magnetic equator location given by the field line produces from the spacecraft location in column 2-5 of that given row.

Column 9-11: Centrifugal equator location given by the field line produces from the spacecraft location in column 2-5 of that given row.

Ephemeris

<http://www-pw.physics.uiowa.edu/~jbg/cas.html>

References:

- Connerney, J. E. P., M. H. Acuña, N. F. Ness, and T. Satoh (1998). New models of Jupiter's magnetic field constrained by the Io flux tube footprint, *J. Geophys. Res.*, *103*(A6), 11,929–11,939.
- Connerney, J.E.P., Acuna, M.H. & Ness, N.F. (1981). Modeling the Jovian current sheet and inner magnetosphere. *J. Geophys. Res.*, *86*, 8370 - 8384.

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