C. D. P. P.

The MAGLIB and ROCOTLIB software libraries

http://cdpp.cesr.fr   **e-mail: cdpp@cesr.fr**
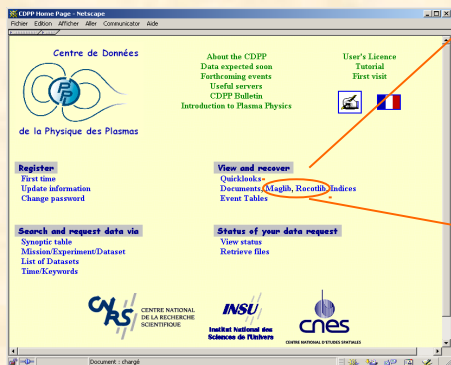
The **MAGLIB** library is a large set of **general Geographic, Geophysics and Geomagnetic calculation modules** developed by **Jean-Claude Kosik** (French Space Agency). It results from a thirty-year experience in mission analysis and geophysics software for magnetospheric projects as well as personal research on charged particle motion and quantitative magnetic field modelling.

The **ROCOTLIB** library (RObert's COordinate Transformation LIBrary) has been developed **by Patrick Robert** (CNRS/CETP - Centre d'étude des Environnements Terrestre et Planétaires - France). It is a set of modules to **perform transformations between the various coordinate systems used in geophysical and magnetospheric studies**.
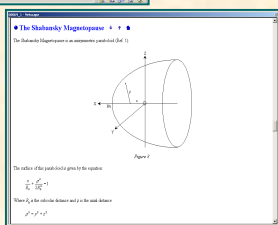
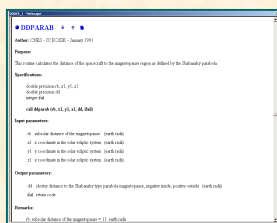*Both libraries are freely delivered with portable source code, test programs, mathematical description and user manual*

Maglib

A full set of documentation :
Users manual
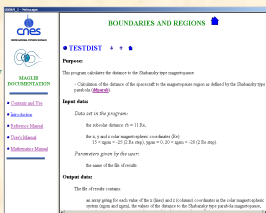**Reference manual**
Mathematics manual
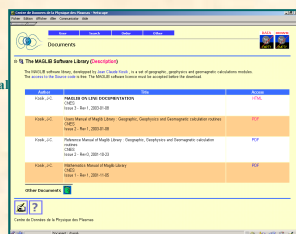
The mathematics manual describes the used mathematical solutions

The Reference manual describes each elementary module

The users manual describes each program that uses several elementary modules for more complex caclulations

Main topics

Coordinate transformations
Boundaries and regions
Internal Magnetic field models
External Magnetic field models
Conjugate points calculation
Magnetospheric physics calculations
Astronomy and celestial mechanics
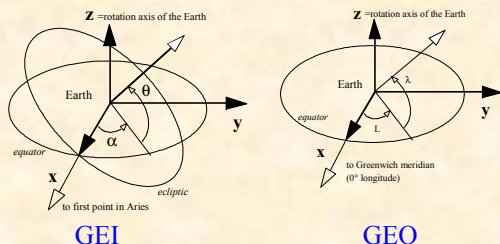Mathematics
Date calculations

Maglib is written in Fortran 77

Rocotlib

12 coordinates systems :
GEI : Geocentric Equatorial Inertial system
GEO : Geographic system
MAG : Geomagnetic system
and also **GSE,GSEQ, GSM, SM, DM, VDH, SR, SR2, MFA**

A precise coordinates systems description

A mathematical description of each transformation e.g. GEI to GEO

transformation subroutine : tgeigeo
subroutine tgeigeo(xgei,ygei,zgei,xgeo,ygeo,zgeo)
transforms_gei_to_geo : *GEI => GEO system*
input : xgei,ygei,zgei   Cartesian gei coordinates
output: xgeo,ygeo,zgeo   Cartesian geo coordinates
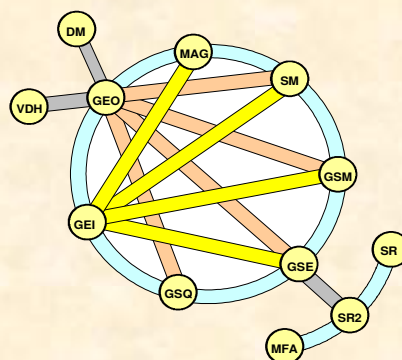
ROCOTLIB is written in Fortran 77 and compatible with Fortran 90 It will be soon available in the IDL and PV-Waves programming languages

Addtionnal modules are provided for :
- dates and time conversions
- computations of useful parameters (Direction of the Sun, dipole…) etc.

Schematic diagram of transformations