Rotation,Nutation,andPrecessionModel

5.0

Generated by Doxygen 1.8.5

Wed Jun 1 2022 12:07:54

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6.4 GenericRNP

Files

- file GenericRNP/include/class_declarations.hh

  Forward declarations of classes defined for JEOD 2.0 Generic RNP.
- file planet_orientation.hh

  Establish a pure virtual framework for interfacing with the DynManager to set a planet orientation, meaning the transformation information from a planet's inertial frame to it's planet fixed frame.
- file planet_rnp.hh

  Establish a framework for rotation-nutatation-precession style planet attitude models.
- file planet_rotation.hh

  Pure virtual polymorphic base class for all forms of planet rotation in th RNP model including precession, nutation, polar motion and axial rotation.
- file planet_rotation_init.hh

  Pure virtual polymorphic base class meant to be used by PlanetRotation::initialize when a large amount of data that could possibly change must be used for rotation calculation.
- file RNP_messages.hh

  Implement RNP_messages.
- file planet_orientation.cc

  Implement PlanetOrientation.
- file planet_rnp.cc

  Implement PlanetRNP.
- file planet_rotation.cc

  Implemenation for PlanetRotation.
- file planet_rotation_init.cc

  Implementation for PlanetRotationInit.
- file RNP_messages.cc

  Implement RNP_messages.

Namespaces

- jeod

  Namespace jeod.

Macros

- #define PATH "environment/RNP/"

6.4.1 Detailed Description

6.4.2 Macro Definition Documentation

6.4.2.1 #define PATH "environment/RNP/"

Definition at line 41 of file RNP_messages.cc.

6.5 RNPJ2000

Files

- file RNPJ2000/include/class_declarations.hh

  Forward declarations of classes defined for JEOD 2.0 J2000 RNP.
- file include/nutation_j2000.hh

  Model the nutation portion of the RNP routine for the Standard Epoch J2000 This is form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.
- file nutation_j2000_init.hh

  Used to load data and initialize the NutationJ2000 class through NutationJ2000::initialize.
- file polar_motion_j2000.hh

  Model the polar motion portion of the RNP routine for the Standard Epoch J2000.
- file polar_motion_j2000_init.hh

  Used to load data and initialize the PolarMotionJ2000 class through PolarMotionJ2000::initialize.
- file precession_j2000.hh

  Model the precession for the RNP routine for the Standard Epoch J2000 This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.
- file include/rnp_j2000.hh

  A specific implementation of PlanetRNP, for Earth.
- file rotation_j2000.hh

  Model the axial rotation portion of the RNP routine for the Standard Epoch J2000.
- file nutation_j2000.cc

  Implementation for the NutationJ2000 class.
- file nutation_j2000_init.cc

  Implementation of NutationJ2000Init.
- file polar_motion_j2000.cc

  Implementation of PolarMotionJ2000.
- file polar_motion_j2000_init.cc

  Implementation for PolarMotionJ2000Init.
- file precession_j2000.cc

  Implementation for PrecessionJ2000.
- file rnp_j2000.cc

  Implementation for RNPJ2000.
- file rotation_j2000.cc

  Implementation of RotationJ2000.

Namespaces

- jeod

  Namespace jeod.

6.5.1 Detailed Description

6.6 RNPMars

Files

- file nutation_mars.hh

  Represent the nutation portion of the JPL-developed "Pathfinder" Mars orientation model.
- file precession_mars.hh

  Represent the precession portion of the JPL-developed "Pathfinder" Mars orientation model.
- file include/rnp_mars.hh

  A specific implementation of PlanetRNP, for Mars.
- file rotation_mars.hh

  Represent the axial rotation portion of the JPL-developed "Pathfinder" Mars orientation model.
- file nutation_mars.cc

  Implementation for the NutationMars class.
- file precession_mars.cc

  Implementation of PrecessionMars.
- file rnp_mars.cc

  Implementation of RNPMars.
- file rotation_mars.cc

  Implementation of RotationMars.

Namespaces

- jeod

  Namespace jeod.

6.6.1 Detailed Description

Chapter 7

Namespace Documentation

7.1 jeod Namespace Reference

Namespace jeod.

Data Structures

- class PlanetOrientation

  The generic framework for orientation models to interact with a DynManager object.
- class PlanetRNP

  The generic framework for orientation models based on the RNP paradigm.
- class PlanetRotation

  The generic base class for all planet transformations.
- class PlanetRotationInit

  The generic base class for all initializing classes for PlanetRotation derived classes.
- class RNPMessages

  Describes messages used in the RNP model.
- class NutationJ2000Init_nutation_j2000_default_data
- class RNPJ2000_rnp_j2000_default_data
- class PolarMotionJ2000Init_xpyp_daily_default_data
- class PolarMotionJ2000Init_xpyp_monthly_default_data
- class NutationJ2000

  Implements the nutation portion of the J2000 RNP.
- class NutationJ2000Init

  The NutationJ2000Init contains coefficients and other data used to initalize a NutationJ2000 object.
- class PolarMotionJ2000

  Implements the polar motion portion of the J2000 RNP.
- class PolarMotionJ2000Init

  Initializes the PolarMotionJ2000 object.
- class PrecessionJ2000

  Implements the precession portion of the J2000 RNP.
- class RNPJ2000

  Implements the J2000 RNP model using the generic RNP framework.
- class RotationJ2000

  Implements the axial rotation portion of J2000 RNP.
- class RNPMars_rnp_mars_default_data
- class NutationMars

Implements the nutation portion of the "Pathfinder" Mars RNP model.

- class PrecessionMars

  Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

- class RNPMars

  Implements the "Pathfinder" Mars RNP model using the generic RNP framework.

- class RotationMars

  Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

7.1.1 Detailed Description

Namespace jeod.

Chapter 8

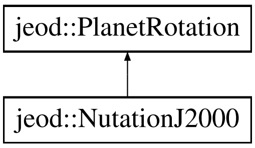
Data Structure Documentation

8.1 jeod::NutationJ2000 Class Reference

Implements the nutation portion of the J2000 RNP.

`#include <nutation_j2000.hh>`

Inheritance diagram for jeod::NutationJ2000:



Public Member Functions

- NutationJ2000 ()

  Constructor.
- virtual ∼NutationJ2000 ()

  destructor
- virtual void update_rotation ()

  Specific implementation of update_rotation, from the polymorphic pure virtual base class PlanetRotation.
- virtual void initialize (PlanetRotationInit ∗init)

  Initialize the various coefficients needed for the calculation of nutation.

Data Fields

- unsigned int num_coeffs

  The number of coefficients in the 9 arrays directly following this decleration.
- double ∗ L_coeffs

  The coefficients to calculate mean anomaly of the moon.
- double ∗ M_coeffs

  The coefficients to calculate mean anomaly of the sun.
- double ∗ F_coeffs

  The coefficients to calculate mean argument of lattitude of the moon.
- double ∗ D_coeffs

  The coefficients to calculate mean elongation from the sun.

- double ∗ omega_coeffs

  The coefficients to calculate the right ascension of the ascending node of the mean mean lunar orbit.
- double ∗ long_coeffs

  Zero order (in time) coefficients for calculating the nutation in longitude.
- double ∗ long_t_coeffs

  The first order (in time) coefficients for calculating the nutation in longitude.
- double ∗ obliq_coeffs

  Zero order coefficients for calculating the nutation in obliquity.
- double ∗ obliq_t_coeffs

  First order coefficnets for calculating the nutation in obliquity.
- double nutation_in_longitude

  The nutation in longitude from the last call of update.
- double nutation_in_obliquity

  The nutation in obliquity from the last call of update.
- double L

  Last calculated mean anomaly of the moon.
- double M

  Last calculated mean anomaly of the sun.
- double F

  Last calculated mean argument of latitude of the moon.
- double D

  Last calculated mean elongation from the sun.
- double omega

  Last calculated ascension of the ascending node of the mean lunar orbit.
- double epsilon_bar

  Last calculated mean obliqutiy of the ecliptic.
- double equa_of_equi

  Last calculated equations of the equinox.

Private Member Functions

- NutationJ2000 & operator= (const NutationJ2000 &rhs)
- NutationJ2000 (const NutationJ2000 &rhs)

Friends

- class InputProcessor
- void init_attrjeod__NutationJ2000 ()

Additional Inherited Members

8.1.1 Detailed Description

Implements the nutation portion of the J2000 RNP.

Definition at line 63 of file include/nutation_j2000.hh.

8.1.2 Constructor & Destructor Documentation

8.1.2.1 jeod::NutationJ2000::NutationJ2000 (void)

Constructor.

Initialize all in class data

Definition at line 73 of file nutation_j2000.cc.

8.1.2.2 jeod::NutationJ2000::∼NutationJ2000 (void) [virtual]

destructor

Definition at line 103 of file nutation_j2000.cc.

References D_coeffs, F_coeffs, L_coeffs, long_coeffs, long_t_coeffs, M_coeffs, obliq_coeffs, obliq_t_coeffs, and omega_coeffs.

8.1.2.3 jeod::NutationJ2000::NutationJ2000 (const NutationJ2000 & *rhs*) [private]

8.1.3 Member Function Documentation

8.1.3.1 void jeod::NutationJ2000::initialize (PlanetRotationInit ∗ *init*) [virtual]

Initialize the various coefficients needed for the calculation of nutation.

init must be of type NutationJ2000Init or a fail message will occur

Parameters

in	*init*	NutationJ2000Init object with needed coefficients

Reimplemented from jeod::PlanetRotation.

Definition at line 276 of file nutation_j2000.cc.

References jeod::NutationJ2000Init::D_coeffs, D_coeffs, jeod::NutationJ2000Init::F_coeffs, F_coeffs, jeod::RNPMessages::initialization_error, jeod::NutationJ2000Init::L_coeffs, L_coeffs, jeod::NutationJ2000Init::long_coeffs, long_coeffs, jeod::NutationJ2000Init::long_t_coeffs, long_t_coeffs, jeod::NutationJ2000Init::M_coeffs, M_coeffs, jeod::NutationJ2000Init::num_coeffs, num_coeffs, jeod::NutationJ2000Init::obliq_coeffs, obliq_coeffs, jeod::NutationJ2000Init::obliq_t_coeffs, obliq_t_coeffs, jeod::NutationJ2000Init::omega_coeffs, and omega_coeffs.

8.1.3.2 NutationJ2000& jeod::NutationJ2000::operator= (const NutationJ2000 & *rhs*) [private]

8.1.3.3 void jeod::NutationJ2000::update_rotation (void) [virtual]

Specific implementation of update_rotation, from the polymorphic pure virtual base class PlanetRotation.

Reimplemented from jeod::PlanetRotation.

Definition at line 151 of file nutation_j2000.cc.

References jeod::PlanetRotation::current_time, D, D_coeffs, jeod::PlanetRotation::DEGTORAD, epsilon_bar, equa_of_equi, F, F_coeffs, L, L_coeffs, long_coeffs, long_t_coeffs, M, M_coeffs, num_coeffs, nutation_in_longitude, nutation_in_obliquity, obliq_coeffs, obliq_t_coeffs, omega, omega_coeffs, and jeod::PlanetRotation::rotation.

8.1.4 Friends And Related Function Documentation

8.1.4.1 void init_attrjeod__NutationJ2000 ( ) [friend]

8.1.4.2 friend class InputProcessor [friend]

Definition at line 65 of file include/nutation_j2000.hh.

8.1.5 Field Documentation

8.1.5.1 double jeod::NutationJ2000::D

Last calculated mean elongation from the sun.

trick_units(–)

Definition at line 146 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.2 double* jeod::NutationJ2000::D_coeffs

The coefficients to calculate mean elongation from the sun.

trick_units(–)

Definition at line 91 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.3 double jeod::NutationJ2000::epsilon_bar

Last calculated mean obliqutiy of the ecliptic.

trick_units(–)

Definition at line 156 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.4 double jeod::NutationJ2000::equa_of_equi

Last calculated equations of the equinox.

trick_units(–)

Definition at line 161 of file include/nutation_j2000.hh.

Referenced by jeod::RotationJ2000::update_rotation(), and update_rotation().

8.1.5.5 double jeod::NutationJ2000::F

Last calculated mean argument of latitude of the moon.

trick_units(–)

Definition at line 142 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.6 double* jeod::NutationJ2000::F_coeffs

The coefficients to calculate mean argument of lattitude of the moon.

trick_units(–)

Definition at line 87 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.7 double jeod::NutationJ2000::L

Last calculated mean anomaly of the moon.

trick_units(–)

Definition at line 134 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.8 double∗ jeod::NutationJ2000::L_coeffs

The coefficients to calculate mean anomaly of the moon.

trick_units(–)

Definition at line 79 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.9 double∗ jeod::NutationJ2000::long_coeffs

Zero order (in time) coefficients for calculating the nutation in longitude.

trick_units(–)

Definition at line 103 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.10 double∗ jeod::NutationJ2000::long_t_coeffs

The first order (in time) coefficients for calculating the nutation in longitude.

trick_units(–)

Definition at line 108 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.11 double jeod::NutationJ2000::M

Last calculated mean anomaly of the sun.

trick_units(–)

Definition at line 138 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.12 double∗ jeod::NutationJ2000::M_coeffs

The coefficients to calculate mean anomaly of the sun.

trick_units(–)

Definition at line 83 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.13 unsigned int jeod::NutationJ2000::num_coeffs

The number of coefficients in the 9 arrays directly following this decleration.

trick_units(count)

Definition at line 74 of file include/nutation_j2000.hh.

Referenced by initialize(), and update_rotation().

8.1.5.14 double jeod::NutationJ2000::nutation_in_longitude

The nutation in longitude from the last call of update.

trick_units(–)

Definition at line 124 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.15 double jeod::NutationJ2000::nutation_in_obliquity

The nutation in obliquity from the last call of update.

trick_units(–)

Definition at line 129 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.16 double∗ jeod::NutationJ2000::obliq_coeffs

Zero order coefficients for calculating the nutation in obliquity.

trick_units(–)

Definition at line 113 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.17 double∗ jeod::NutationJ2000::obliq_t_coeffs

First order coefficnets for calculating the nutation in obliquity.

trick_units(–)

Definition at line 118 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

8.1.5.18 double jeod::NutationJ2000::omega

Last calculated ascension of the ascending node of the mean lunar orbit.

trick_units(–)

Definition at line 151 of file include/nutation_j2000.hh.

Referenced by update_rotation().

8.1.5.19 double∗ jeod::NutationJ2000::omega_coeffs

The coefficients to calculate the right ascension of the ascending node of the mean mean lunar orbit.

trick_units(–)

Definition at line 97 of file include/nutation_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼NutationJ2000().

The documentation for this class was generated from the following files:

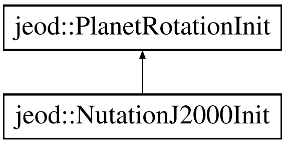
- include/nutation_j2000.hh
- nutation_j2000.cc

8.2 jeod::NutationJ2000Init Class Reference

The NutationJ2000Init contains coefficients and other data used to initalize a NutationJ2000 object.

```
#include <nutation_j2000_init.hh>
```

Inheritance diagram for jeod::NutationJ2000Init:



Public Member Functions

- NutationJ2000Init ()

  constructor.
- virtual ∼NutationJ2000Init ()

  Destructor.

Data Fields

- int num_coeffs

  The number of coefficients in the 9 arrays directly following this decleration.
- double ∗ L_coeffs

  The coefficients to calculate mean anomaly of the moon.
- double ∗ M_coeffs

  The coefficients to calculate mean anomaly of the sun.
- double ∗ F_coeffs

  The coefficients to calculate mean argument of lattitude of the moon.
- double ∗ D_coeffs

  The coefficients to calculate mean elongation from the sun.
- double ∗ omega_coeffs

  The coefficients to calculate the right ascension of the ascending node of the mean mean lunar orbit.
- double ∗ long_coeffs

  Zero order (in time) coefficients for calculating the nutation in longitude.
- double ∗ long_t_coeffs

  The first order (in time) coefficients for calculating the nutation in longitude.
- double ∗ obliq_coeffs

  Zero order coefficients for calculating the nutation in obliquity.
- double ∗ obliq_t_coeffs

  First order coefficnets for calculating the nutation in obliquity.

Private Member Functions

- NutationJ2000Init & operator= (const NutationJ2000Init &rhs)
- NutationJ2000Init (const NutationJ2000Init &rhs)

Friends

- class InputProcessor
- void init_attrjeod__NutationJ2000Init ()

8.2.1 Detailed Description

The NutationJ2000Init contains coefficients and other data used to initalize a NutationJ2000 object.

Definition at line 63 of file nutation_j2000_init.hh.

8.2.2 Constructor & Destructor Documentation

8.2.2.1 jeod::NutationJ2000Init::NutationJ2000Init (void)

constructor.

initialize low level data

Definition at line 63 of file nutation_j2000_init.cc.

8.2.2.2 jeod::NutationJ2000Init::∼NutationJ2000Init (void) [virtual]

Destructor.

Definition at line 83 of file nutation_j2000_init.cc.

References D_coeffs, F_coeffs, L_coeffs, long_coeffs, long_t_coeffs, M_coeffs, obliq_coeffs, obliq_t_coeffs, and omega_coeffs.

8.2.2.3 jeod::NutationJ2000Init::NutationJ2000Init (const **NutationJ2000Init** & *rhs*) [private]

8.2.3 Member Function Documentation

8.2.3.1 **NutationJ2000Init**& jeod::NutationJ2000Init::operator= (const **NutationJ2000Init** & *rhs*) [private]

8.2.4 Friends And Related Function Documentation

8.2.4.1 void init_attrjeod__NutationJ2000Init ( ) [friend]

8.2.4.2 friend class InputProcessor [friend]

Definition at line 65 of file nutation_j2000_init.hh.

8.2.5 Field Documentation

8.2.5.1 double∗ jeod::NutationJ2000Init::D_coeffs

The coefficients to calculate mean elongation from the sun.

trick_units(–)

Definition at line 90 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.2 double∗ jeod::NutationJ2000Init::F_coeffs

The coefficients to calculate mean argument of lattitude of the moon.

trick_units(–)

Definition at line 86 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.3 double∗ jeod::NutationJ2000Init::L_coeffs

The coefficients to calculate mean anomaly of the moon.

trick_units(–)

Definition at line 78 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.4 double∗ jeod::NutationJ2000Init::long_coeffs

Zero order (in time) coefficients for calculating the nutation in longitude.

trick_units(–)

Definition at line 102 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.5 double∗ jeod::NutationJ2000Init::long_t_coeffs

The first order (in time) coefficients for calculating the nutation in longitude.

trick_units(–)

Definition at line 107 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.6 double∗ jeod::NutationJ2000Init::M_coeffs

The coefficients to calculate mean anomaly of the sun.

trick_units(–)

Definition at line 82 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.7 int jeod::NutationJ2000Init::num_coeffs

The number of coefficients in the 9 arrays directly following this decleration.

trick_units(count)

Definition at line 73 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), and jeod::NutationJ2000::initialize().

8.2.5.8 double∗ jeod::NutationJ2000Init::obliq_coeffs

Zero order coefficients for calculating the nutation in obliquity.

trick_units(–)

Definition at line 112 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.9 double∗ jeod::NutationJ2000Init::obliq_t_coeffs

First order coefficnets for calculating the nutation in obliquity.

trick_units(–)

Definition at line 117 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

8.2.5.10 double∗ jeod::NutationJ2000Init::omega_coeffs

The coefficients to calculate the right ascension of the ascending node of the mean mean lunar orbit.

trick_units(–)

Definition at line 96 of file nutation_j2000_init.hh.

Referenced by jeod::NutationJ2000Init_nutation_j2000_default_data::initialize(), jeod::NutationJ2000::initialize(), and ∼NutationJ2000Init().

The documentation for this class was generated from the following files:

- nutation_j2000_init.hh
- nutation_j2000_init.cc

8.3 jeod::NutationJ2000Init_nutation_j2000_default_data Class Reference

```
#include <nutation_j2000.hh>
```

Public Member Functions

- void initialize (NutationJ2000Init ∗)

8.3.1 Detailed Description

Definition at line 18 of file data/include/nutation_j2000.hh.

8.3.2 Member Function Documentation

8.3.2.1 void jeod::NutationJ2000Init_nutation_j2000_default_data::initialize (NutationJ2000Init ∗ *NutationJ2000Init_ptr*)

Definition at line 42 of file data_nutation_j2000.cc.

References jeod::NutationJ2000Init::D_coeffs, jeod::NutationJ2000Init::F_coeffs, jeod::NutationJ2000Init::L_coeffs, jeod::NutationJ2000Init::long_coeffs, jeod::NutationJ2000Init::long_t_coeffs, jeod::NutationJ2000Init::M_coeffs, jeod::NutationJ2000Init::num_coeffs, jeod::NutationJ2000Init::obliq_coeffs, jeod::NutationJ2000Init::obliq_t_coeffs, and jeod::NutationJ2000Init::omega_coeffs.

The documentation for this class was generated from the following files:

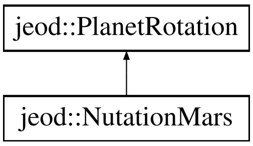
- data/include/nutation_j2000.hh
- data_nutation_j2000.cc

8.4 jeod::NutationMars Class Reference

Implements the nutation portion of the "Pathfinder" Mars RNP model.

```
#include <nutation_mars.hh>
```

Inheritance diagram for jeod::NutationMars:



Public Member Functions

- NutationMars ()

  Default constructor.
- virtual ∼NutationMars ()

  Destructor.
- virtual void update_rotation ()

  NutationMars specific implementation of update_rotation, used here to describe nutation effects in longitude and obliquity.

Data Fields

- double nutation_in_longitude

  The latest calculated nutation correction term in longitude.
- double nutation_in_obliquity

  The latest calculated nutation correction term in obliquity.
- double I_at_j2000

  The (constant) obliquity angle of Mars at the J2000 epoch.
- double I_dot

  The (constant) simple secular change in Mars obliquity relative to the Mars mean orbit.
- double obliquity_angle

  The latest calculated angle of obliquity, that is, the current orbit inclination angle as measured relative to the Mars mean orbit, measured since the J2000 epoch.
- double mean_motion

The mean motion of Mars, that is, the average orbit arc traversed.

- double mean_anomaly_j2000

  The Mars mean anomaly at the J2000 epoch.
- double q_angle_j2000

  Parameter q is a slowly varying angle defined in Konopliv 2006 as 2 times w, where w is the argument of perihelion of the Mars orbit relative to the node of the Mars equator and Mars mean orbit.
- double ∗ l_m_orig

  The obliquity nutation amplitude parameters.
- double ∗ psi_m_orig

  The longitude nutation amplitude parameters.
- double ∗ int_to_double

  0 to 9 cast as doubles for use in summation

Private Member Functions

- NutationMars & operator= (const NutationMars &rhs)
- NutationMars (const NutationMars &rhs)

Friends

- class InputProcessor
- void init_attrjeod__NutationMars ()

Additional Inherited Members

8.4.1 Detailed Description

Implements the nutation portion of the "Pathfinder" Mars RNP model.

Definition at line 62 of file nutation_mars.hh.

8.4.2 Constructor & Destructor Documentation

8.4.2.1 jeod::NutationMars::NutationMars (void)

Default constructor.

Definition at line 66 of file nutation_mars.cc.

8.4.2.2 jeod::NutationMars::∼NutationMars (void) [virtual]

Destructor.

Definition at line 87 of file nutation_mars.cc.

References l_m_orig, int_to_double, and psi_m_orig.

8.4.2.3 jeod::NutationMars::NutationMars (const NutationMars & *rhs*) [private]

8.4.3 Member Function Documentation

8.4.3.1 NutationMars& jeod::NutationMars::operator= (const NutationMars & *rhs*) [private]

8.4.3.2 void jeod::NutationMars::update_rotation (void) [virtual]

NutationMars specific implementation of update_rotation, used here to describe nutation effects in longitude and obliquity.

Reimplemented from jeod::PlanetRotation.

Definition at line 112 of file nutation_mars.cc.

References jeod::PlanetRotation::current_time, I_at_j2000, I_dot, I_m_orig, int_to_double, mean_anomaly_j2000, mean_motion, nutation_in_longitude, nutation_in_obliquity, obliquity_angle, psi_m_orig, q_angle_j2000, and jeod::PlanetRotation::rotation.

8.4.4 Friends And Related Function Documentation

8.4.4.1 void init_attrjeod__NutationMars ( ) [friend]

8.4.4.2 friend class InputProcessor [friend]

Definition at line 64 of file nutation_mars.hh.

8.4.5 Field Documentation

8.4.5.1 double jeod::NutationMars::I_at_j2000

The (constant) obliquity angle of Mars at the J2000 epoch.

trick_units(radian)

Definition at line 81 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.4.5.2 double jeod::NutationMars::I_dot

The (constant) simple secular change in Mars obliquity relative to the Mars mean orbit.

trick_units(radian/s)

Definition at line 87 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.4.5.3 double* jeod::NutationMars::I_m_orig

The obliquity nutation amplitude parameters.

trick_units(radian)

Definition at line 117 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), update_rotation(), and ∼NutationMars().

8.4.5.4 double* jeod::NutationMars::int_to_double

0 to 9 cast as doubles for use in summation

trick_units(–)

Definition at line 127 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), update_rotation(), and ∼NutationMars().

8.4.5.5 double jeod::NutationMars::mean_anomaly_j2000

The Mars mean anomaly at the J2000 epoch.

trick_units(radian)

Definition at line 104 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.4.5.6 double jeod::NutationMars::mean_motion

The mean motion of Mars, that is, the average orbit arc traversed.

trick_units(radian/s)

Definition at line 99 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.4.5.7 double jeod::NutationMars::nutation_in_longitude

The latest calculated nutation correction term in longitude.

trick_units(radian)

Definition at line 71 of file nutation_mars.hh.

Referenced by jeod::RotationMars::update_rotation(), jeod::PrecessionMars::update_rotation(), and update_rotation().

8.4.5.8 double jeod::NutationMars::nutation_in_obliquity

The latest calculated nutation correction term in obliquity.

trick_units(radian)

Definition at line 76 of file nutation_mars.hh.

Referenced by update_rotation().

8.4.5.9 double jeod::NutationMars::obliquity_angle

The latest calculated angle of obliquity, that is, the current orbit inclination angle as measured relative to the Mars mean orbit, measured since the J2000 epoch.

trick_units(radian)

Definition at line 94 of file nutation_mars.hh.

Referenced by jeod::RotationMars::update_rotation(), and update_rotation().

8.4.5.10 double∗ jeod::NutationMars::psi_m_orig

The longitude nutation amplitude parameters.

trick_units(radian)

Definition at line 122 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), update_rotation(), and ∼NutationMars().

8.4.5.11 double jeod::NutationMars::q_angle_j2000

Parameter q is a slowly varying angle defined in Konopliv 2006 as 2 times w, where w is the argument of perihelion of the Mars orbit relative to the node of the Mars equator and Mars mean orbit.

This data member is the value of q at the J2000 epoch.trick_units(radian)

Definition at line 112 of file nutation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

The documentation for this class was generated from the following files:

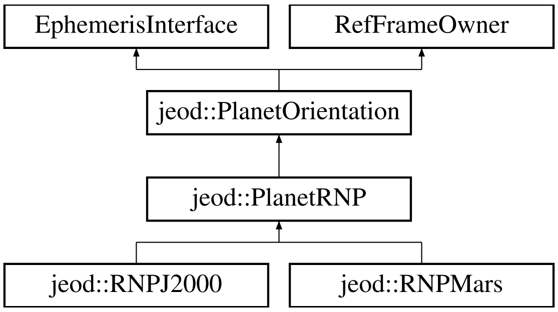
- nutation_mars.hh
- nutation_mars.cc

8.5 jeod::PlanetOrientation Class Reference

The generic framework for orientation models to interact with a DynManager object.

```
#include <planet_orientation.hh>
```

Inheritance diagram for jeod::PlanetOrientation:



Public Member Functions

- PlanetOrientation ()

  Default constructor; constructs a PlanetOrientation object.
- virtual ∼PlanetOrientation ()

  Class destructor.
- virtual void initialize (DynManager &dyn_manager)

  Goes to the dyn manager given and searches for the planet indicated by the user inputted name, in the given dyn manager.
- virtual void activate ()

  Activates the PlanetOrientation model.
- virtual void deactivate ()

  Deactivates the PlanetOrientation model.
- virtual void ephem_initialize (EphemeridesManager &manager)

  Implements the EphemInterface pure virtual function ephem_initialize.
- virtual void ephem_activate (EphemeridesManager &manager)

  Mark the model as being activate or inactive.
- virtual void ephem_build_tree (EphemeridesManager &manager)

  Function, for a particular ephemeris model, nominally builds the particular models portions of the reference frame tree.
- void set_name (std::string name_in)

Setter for the name.

- virtual const char ∗ get_name () const =0

  A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

Data Fields

- bool active

  Is the orientation model actively updating? Defaults to true.
- Planet ∗ planet

  The planet the attitude model will be working on.
- std::string name

  Name of the planet the attitude model will be working on.
- RefFrameRot ∗ planet_rot_state

  The current rotational state of the planet.
- double planet_omega

  Nominal axial velocity of the earth.
- EphemerisOrientation orient_interface

  The ephemeris interface to the in question orientation.

Private Member Functions

- PlanetOrientation & operator= (const PlanetOrientation &rhs)

  Not implemented.
- PlanetOrientation (const PlanetOrientation &rhs)

  Not implemented.

Friends

- class InputProcessor
- void init_attrjeod__PlanetOrientation ()

8.5.1 Detailed Description

The generic framework for orientation models to interact with a DynManager object.

Definition at line 63 of file planet_orientation.hh.

8.5.2 Constructor & Destructor Documentation

8.5.2.1 jeod::PlanetOrientation::PlanetOrientation (void)

Default constructor; constructs a PlanetOrientation object.

Definition at line 60 of file planet_orientation.cc.

8.5.2.2 jeod::PlanetOrientation::∼PlanetOrientation (void) [virtual]

Class destructor.

Definition at line 75 of file planet_orientation.cc.

8.5.2.3 jeod::PlanetOrientation::PlanetOrientation (const PlanetOrientation & *rhs*) [private]

Not implemented.

8.5.3 Member Function Documentation

8.5.3.1 void jeod::PlanetOrientation::activate ( ) [virtual]

Activates the PlanetOrientation model.

Definition at line 141 of file planet_orientation.cc.

References active.

8.5.3.2 void jeod::PlanetOrientation::deactivate ( ) [virtual]

Deactivates the PlanetOrientation model.

Definition at line 150 of file planet_orientation.cc.

References active.

8.5.3.3 void jeod::PlanetOrientation::ephem_activate (EphemeridesManager & *manager*) [virtual]

Mark the model as being activate or inactive.

Parameters

in,out	*manager*	ephemerides manager

Definition at line 176 of file planet_orientation.cc.

8.5.3.4 void jeod::PlanetOrientation::ephem_build_tree (EphemeridesManager & *manager*) [virtual]

Function, for a particular ephemeris model, nominally builds the particular models portions of the reference frame tree.

This implementation, by default, does nothing

Parameters

in,out	*manager*	ephemerides manager

Definition at line 190 of file planet_orientation.cc.

8.5.3.5 void jeod::PlanetOrientation::ephem_initialize (EphemeridesManager & *manager*) [virtual]

Implements the EphemInterface pure virtual function ephem_initialize.

Note that the stand alone "initialize" function MUST be called before this function. Normal operating procedure is the DynamicsManager calls this function, not the user.

Parameters

in,out	*manager*	ephemerides manager

Definition at line 165 of file planet_orientation.cc.

8.5.3.6 virtual const char* jeod::PlanetOrientation::get_name ( ) const [pure virtual]

A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

Returns

Planet name.

Implemented in jeod::PlanetRNP, jeod::RNPMars, and jeod::RNPJ2000.

8.5.3.7 void jeod::PlanetOrientation::initialize (DynManager & *dyn_manager*) [virtual]

Goes to the dyn manager given and searches for the planet indicated by the user inputted name, in the given dyn manager.

Will send a fail message if the named planet is not found. Additionally, this will register this ephemeris interface with the given DynManager, and will set up the contained EphemerisOrientation to control the named planet.

Parameters

in,out	*dyn_manager*	DynManager where the attitude will be applied

Reimplemented in jeod::RNPMars, and jeod::RNPJ2000.

Definition at line 91 of file planet_orientation.cc.

References jeod::RNPMessages::initialization_error, name, orient_interface, planet, planet_omega, and planet_rot_state.

Referenced by jeod::RNPJ2000::initialize(), and jeod::RNPMars::initialize().

8.5.3.8 PlanetOrientation& jeod::PlanetOrientation::operator= (const PlanetOrientation & *rhs*) [private]

Not implemented.

8.5.3.9 void jeod::PlanetOrientation::set_name (std::string *name_in*) [inline]

Setter for the name.

Definition at line 136 of file planet_orientation.hh.

8.5.4 Friends And Related Function Documentation

8.5.4.1 void init_attrjeod__PlanetOrientation ( ) [friend]

8.5.4.2 friend class InputProcessor [friend]

Definition at line 66 of file planet_orientation.hh.

8.5.5 Field Documentation

8.5.5.1 bool jeod::PlanetOrientation::active

Is the orientation model actively updating? Defaults to true.

trick_units(--)

Definition at line 86 of file planet_orientation.hh.

Referenced by activate(), deactivate(), jeod::RNPJ2000::ephem_update(), jeod::RNPMars::ephem_update(), jeod::RNPJ2000::update_axial_rotation(), jeod::RNPMars::update_axial_rotation(), jeod::RNPJ2000::update_rnp(), and jeod::RNPMars::update_rnp().

8.5.5.2 std::string jeod::PlanetOrientation::name

Name of the planet the attitude model will be working on.

Planet must be found in the DynManager sent in at initializationtrick_units(–)

Definition at line 97 of file planet_orientation.hh.

Referenced by jeod::RNPJ2000_rnp_j2000_default_data::initialize(), jeod::RNPMars_rnp_mars_default_data::initialize(), and initialize().

8.5.5.3 EphemerisOrientation jeod::PlanetOrientation::orient_interface

The ephemeris interface to the in question orientation.

trick_units(–)

Definition at line 130 of file planet_orientation.hh.

Referenced by jeod::RNPJ2000::ephem_update(), jeod::RNPMars::ephem_update(), and initialize().

8.5.5.4 Planet∗ jeod::PlanetOrientation::planet

The planet the attitude model will be working on.

trick_units(–)

Definition at line 91 of file planet_orientation.hh.

Referenced by initialize(), jeod::RNPJ2000::update_axial_rotation(), jeod::RNPMars::update_axial_rotation(), jeod::RNPJ2000::update_rnp(), and jeod::RNPMars::update_rnp().

8.5.5.5 double jeod::PlanetOrientation::planet_omega

Nominal axial velocity of the earth.

trick_units(radian/s)

Definition at line 107 of file planet_orientation.hh.

Referenced by jeod::RNPJ2000_rnp_j2000_default_data::initialize(), jeod::RNPMars_rnp_mars_default_data::initialize(), initialize(), jeod::RNPJ2000::initialize(), jeod::RNPMars::initialize(), and jeod::PlanetRNP::propagate_rnp().

8.5.5.6 RefFrameRot∗ jeod::PlanetOrientation::planet_rot_state

The current rotational state of the planet.

trick_units(–)

Definition at line 102 of file planet_orientation.hh.

Referenced by initialize(), and jeod::PlanetRNP::propagate_rnp().

The documentation for this class was generated from the following files:

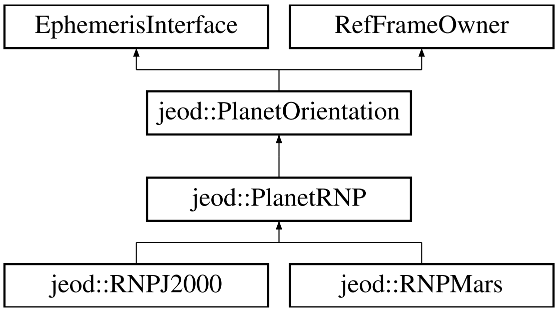
- planet_orientation.hh
- planet_orientation.cc

8.6 jeod::PlanetRNP Class Reference

The generic framework for orientation models based on the RNP paradigm.

`#include <planet_rnp.hh>`

Inheritance diagram for jeod::PlanetRNP:



Public Types

- enum RNPFidelity { FullRNP = 0, RotationOnly = 1, ConstantNP = 2 }

  Specifies the initialization fidelity of the RNP model.

Public Member Functions

- PlanetRNP ()

  Default constructor; constructs a PlanetRNP object.
- virtual ∼PlanetRNP ()

  Class destructor.
- void update_rnp ()

  Invokes the calculation for all rotation models contained in the RNP, used on the last time set in each model through PlanetRotation::set_time.
- void update_axial_rotation ()

  Same as update_rnp, but only the axial_rotation will be updated.
- void propagate_rnp ()

  Multiples out the (up to) four planet rotation models (nutation, precession, polar motion and rotation), leaving out models whose pointers are NULL, and feeds it to the planet attitude found in the dyn manager given in initialize.
- virtual const char ∗ get_name () const =0

  A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

Data Fields

- PlanetRotation ∗ nutation

  Pointer to the nutation model.
- PlanetRotation ∗ precession

  Pointer to the precession model.
- PlanetRotation ∗ polar_motion

  Pointer to the polar_motion model.
- PlanetRotation ∗ rotation

  Pointer to the rotation model.
- RNPFidelity rnp_type

  The fidelity of the RNP model.

- bool enable_polar

  Gives the option of turning on or off polar motion.
- double NP_matrix [3][3]

  Rotation Matrix representing: transpose(nutation->rotation) ∗ transpose(precession->rotation)

Protected Attributes

- double scratch_matrix [3][3]

  A transformation matrix used for intermediate math steps.

Private Member Functions

- PlanetRNP & operator= (const PlanetRNP &rhs)

  Not implemented.
- PlanetRNP (const PlanetRNP &rhs)

  Not implemented.

Friends

- class InputProcessor
- void init_attrjeod__PlanetRNP ()

8.6.1 Detailed Description

The generic framework for orientation models based on the RNP paradigm.

Definition at line 71 of file planet_rnp.hh.

8.6.2 Member Enumeration Documentation

8.6.2.1 enum **jeod::PlanetRNP::RNPFidelity**

Specifies the initialization fidelity of the RNP model.

Enumerator

FullRNP Full fidelity RNP matrix. Formerly Full_Term_RNP.

RotationOnly Identity NP matrix, then rotation calculates linearly.

ConstantNP Once calculated NP matrix (at the start), then rotation.

Definition at line 82 of file planet_rnp.hh.

8.6.3 Constructor & Destructor Documentation

8.6.3.1 jeod::PlanetRNP::PlanetRNP (void)

Default constructor; constructs a PlanetRNP object.

Definition at line 73 of file planet_rnp.cc.

References NP_matrix.

8.6.3.2 jeod::PlanetRNP::∼PlanetRNP (void) [virtual]

Class destructor.

Definition at line 89 of file planet_rnp.cc.

8.6.3.3 jeod::PlanetRNP::PlanetRNP (const **PlanetRNP** & *rhs*) [private]

Not implemented.

8.6.4 Member Function Documentation

8.6.4.1 virtual const char∗ jeod::PlanetRNP::get_name ( ) const [pure virtual]

A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

Returns

Planet name.

Implements jeod::PlanetOrientation.

Implemented in jeod::RNPMars, and jeod::RNPJ2000.

8.6.4.2 **PlanetRNP**& jeod::PlanetRNP::operator= (const **PlanetRNP** & *rhs*) [private]

Not implemented.

8.6.4.3 void jeod::PlanetRNP::propagate_rnp (void)

Multiples out the (up to) four planet rotation models (nutation, precession, polar motion and rotation), leaving out models whose pointers are NULL, and feeds it to the planet attitude found in the dyn manager given in initialize.

Definition at line 202 of file planet_rnp.cc.

References ConstantNP, enable_polar, jeod::RNPMessages::fidelity_error, FullRNP, NP_matrix, jeod::PlanetOrientation::planet_omega, jeod::PlanetOrientation::planet_rot_state, polar_motion, rnp_type, jeod::PlanetRotation::rotation, rotation, RotationOnly, scratch_matrix, and jeod::RNPMessages::setup_error.

Referenced by update_axial_rotation(), and update_rnp().

8.6.4.4 void jeod::PlanetRNP::update_axial_rotation (void)

Same as update_rnp, but only the axial_rotation will be updated.

Definition at line 174 of file planet_rnp.cc.

References propagate_rnp(), rotation, jeod::RNPMessages::setup_error, and jeod::PlanetRotation::update_rotation().

Referenced by jeod::RNPJ2000::ephem_update(), jeod::RNPMars::ephem_update(), jeod::RNPJ2000::update_axial_rotation(), and jeod::RNPMars::update_axial_rotation().

8.6.4.5 void jeod::PlanetRNP::update_rnp (void)

Invokes the calculation for all rotation models contained in the RNP, used on the last time set in each model through PlanetRotation::set_time.

Then multiplies out and updates the attitude of the planet found during initialization.

Definition at line 103 of file planet_rnp.cc.

References enable_polar, jeod::RNPMessages::fidelity_error, FullRNP, NP_matrix, nutation, polar_motion, precession, propagate_rnp(), rnp_type, jeod::PlanetRotation::rotation, rotation, jeod::RNPMessages::setup_error, and jeod::PlanetRotation::update_rotation().

Referenced by jeod::RNPJ2000::update_rnp(), and jeod::RNPMars::update_rnp().

8.6.5 Friends And Related Function Documentation

8.6.5.1 void init_attrjeod__PlanetRNP ( ) [friend]

8.6.5.2 friend class InputProcessor [friend]

Definition at line 73 of file planet_rnp.hh.

8.6.6 Field Documentation

8.6.6.1 bool jeod::PlanetRNP::enable_polar

Gives the option of turning on or off polar motion.

trick_units(–)

Definition at line 120 of file planet_rnp.hh.

Referenced by jeod::RNPJ2000_rnp_j2000_default_data::initialize(), jeod::RNPMars_rnp_mars_default_data::initialize(), propagate_rnp(), jeod::RNPMars::RNPMars(), jeod::RNPJ2000::update_rnp(), and update_rnp().

8.6.6.2 double jeod::PlanetRNP::NP_matrix[3][3]

Rotation Matrix representing: transpose(nutation->rotation) ∗ transpose(precession->rotation)

trick_units(–)

Definition at line 126 of file planet_rnp.hh.

Referenced by PlanetRNP(), propagate_rnp(), and update_rnp().

8.6.6.3 PlanetRotation∗ jeod::PlanetRNP::nutation

Pointer to the nutation model.

trick_units(–)

Definition at line 99 of file planet_rnp.hh.

Referenced by jeod::RNPJ2000::RNPJ2000(), jeod::RNPMars::RNPMars(), jeod::RNPJ2000::update_rnp(), update_rnp(), and jeod::RNPMars::update_rnp().

8.6.6.4 PlanetRotation∗ jeod::PlanetRNP::polar_motion

Pointer to the polar_motion model.

trick_units(–)

Definition at line 107 of file planet_rnp.hh.

Referenced by propagate_rnp(), jeod::RNPJ2000::RNPJ2000(), jeod::RNPMars::RNPMars(), jeod::RNPJ2000::update_rnp(), and update_rnp().

8.6.6.5 PlanetRotation∗ jeod::PlanetRNP::precession

Pointer to the precession model.

trick_units(–)

Definition at line 103 of file planet_rnp.hh.

Referenced by jeod::RNPJ2000::RNPJ2000(), jeod::RNPMars::RNPMars(), jeod::RNPJ2000::update_rnp(), update_rnp(), and jeod::RNPMars::update_rnp().

8.6.6.6 RNPFidelity jeod::PlanetRNP::rnp_type

The fidelity of the RNP model.

trick_units(–)

Definition at line 116 of file planet_rnp.hh.

Referenced by jeod::RNPJ2000_rnp_j2000_default_data::initialize(), jeod::RNPMars_rnp_mars_default_data::initialize(), jeod::RNPJ2000::initialize(), jeod::RNPMars::initialize(), propagate_rnp(), jeod::RNPJ2000::update_axial_rotation(), jeod::RNPMars::update_axial_rotation(), jeod::RNPJ2000::update_rnp(), update_rnp(), and jeod::RNPMars::update_rnp().

8.6.6.7 PlanetRotation∗ jeod::PlanetRNP::rotation

Pointer to the rotation model.

trick_units(–)

Definition at line 111 of file planet_rnp.hh.

Referenced by propagate_rnp(), jeod::RNPJ2000::RNPJ2000(), jeod::RNPMars::RNPMars(), jeod::RNPJ2000::update_axial_rotation(), update_axial_rotation(), jeod::RNPMars::update_axial_rotation(), jeod::RNPJ2000::update_rnp(), update_rnp(), and jeod::RNPMars::update_rnp().

8.6.6.8 double jeod::PlanetRNP::scratch_matrix[3][3] [protected]

A transformation matrix used for intermediate math steps.

trick_units(–)

Definition at line 133 of file planet_rnp.hh.

Referenced by propagate_rnp().

The documentation for this class was generated from the following files:

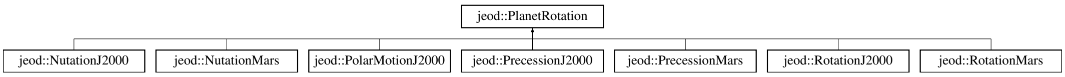
- planet_rnp.hh
- planet_rnp.cc

8.7 jeod::PlanetRotation Class Reference

The generic base class for all planet transformations.

`#include <planet_rotation.hh>`

Inheritance diagram for jeod::PlanetRotation:



Public Member Functions

- PlanetRotation ()

  Constructor, initialize base level data.
- virtual ∼PlanetRotation ()

  Destructor.
- virtual void update_rotation (void)

  Updates the rotation of this particular object, based on the last time set in "set_time".
- virtual void initialize (PlanetRotationInit ∗init)

  Initializes the invoking object from an initialization object.
- virtual void update_time (double time)

  Update the time that the next update_rotation call will use.
- void get_rotation (double rot[3][3])

  Copy the last calculated rotation to 'rot'.
- void get_rotation_transpose (double rot[3][3])

  Same as get_rotation, but returns the transpose.

Data Fields

- double rotation [3][3]

  The transformation matrix outputted by the model after update is called.
- double current_time

  The current time the transformation matrix will be calculated from.

Protected Attributes

- double RADTODEG

  Convert from radians to degrees.
- double DEGTORAD

  Inverse of RADTODEG.
- double DEGTOSEC

  Convert from degrees to arcseconds.
- double SECTODEG

  Inverse of DEGTOSEC.
- double JULIANDAYTOSEC

  Convert from julian day to seconds.
- double SECTOJULIANDAY

  Inverse of JULIANDAYTOSEC.
- double JULIANCENTTODAY

  Convert from julian centuries to julian days.
- double DAYTOJULIANCENT

  Inverse of JULIANCENTTODAY.

Private Member Functions

- PlanetRotation & operator= (const PlanetRotation &rhs)
- PlanetRotation (const PlanetRotation &rhs)

Friends

- class InputProcessor
- void init_attrjeod__PlanetRotation ()

8.7.1 Detailed Description

The generic base class for all planet transformations.

Definition at line 57 of file planet_rotation.hh.

8.7.2 Constructor & Destructor Documentation

8.7.2.1 jeod::PlanetRotation::PlanetRotation (void)

Constructor, initialize base level data.

Definition at line 54 of file planet_rotation.cc.

References DAYTOJULIANCENT, DEGTORAD, DEGTOSEC, JULIANCENTTODAY, JULIANDAYTOSEC, RADTODEG, rotation, SECTODEG, and SECTOJULIANDAY.

8.7.2.2 jeod::PlanetRotation::∼PlanetRotation (void) [virtual]

Destructor.

Definition at line 77 of file planet_rotation.cc.

8.7.2.3 jeod::PlanetRotation::PlanetRotation (const **PlanetRotation** & *rhs*) [private]

8.7.3 Member Function Documentation

8.7.3.1 void jeod::PlanetRotation::get_rotation (double *rot[3][3]*)

Copy the last calculated rotation to 'rot'.

Parameters

out	*rot*	Where the rotation matrix will be stored

Definition at line 99 of file planet_rotation.cc.

References rotation.

8.7.3.2 void jeod::PlanetRotation::get_rotation_transpose (double *rot[3][3]*)

Same as get_rotation, but returns the transpose.

Parameters

out	*rot*	Where the transpose matrix will be stored

Definition at line 111 of file planet_rotation.cc.

References rotation.

8.7.3.3 virtual void jeod::PlanetRotation::initialize (**PlanetRotationInit** ∗ *init*) [inline], [virtual]

Initializes the invoking object from an initialization object.

Parameters

in	*init*	The object that will initialize the invoking object.

Reimplemented in jeod::NutationJ2000, and jeod::PolarMotionJ2000.

Definition at line 155 of file planet_rotation.hh.

8.7.3.4 PlanetRotation& jeod::PlanetRotation::operator= (const PlanetRotation & *rhs*) [private]

8.7.3.5 virtual void jeod::PlanetRotation::update_rotation (void) [inline], [virtual]

Updates the rotation of this particular object, based on the last time set in "set_time".

Reimplemented in jeod::NutationJ2000, jeod::NutationMars, jeod::PrecessionMars, jeod::RotationJ2000, jeod::RotationMars, jeod::PolarMotionJ2000, and jeod::PrecessionJ2000.

Definition at line 131 of file planet_rotation.hh.

Referenced by jeod::PlanetRNP::update_axial_rotation(), and jeod::PlanetRNP::update_rnp().

8.7.3.6 void jeod::PlanetRotation::update_time (double *time*) [virtual]

Update the time that the next update_rotation call will use.

Parameters

in	*time*	Time. units and UTC/UT1/TAI etc are determined by the individual PlanetRotation model

Definition at line 87 of file planet_rotation.cc.

References current_time.

Referenced by jeod::RNPJ2000::update_axial_rotation(), jeod::RNPMars::update_axial_rotation(), jeod::RNPJ2000::update_rnp(), and jeod::RNPMars::update_rnp().

8.7.4 Friends And Related Function Documentation

8.7.4.1 void init_attrjeod__PlanetRotation ( ) [friend]

8.7.4.2 friend class InputProcessor [friend]

Definition at line 59 of file planet_rotation.hh.

8.7.5 Field Documentation

8.7.5.1 double jeod::PlanetRotation::current_time

The current time the transformation matrix will be calculated from.

Unitless so that models with different time scales can be used with one underlying modeltrick_units(–)

Definition at line 74 of file planet_rotation.hh.

Referenced by jeod::PrecessionJ2000::update_rotation(), jeod::PolarMotionJ2000::update_rotation(), jeod::RotationMars::update_rotation(), jeod::RotationJ2000::update_rotation(), jeod::PrecessionMars::update_rotation(), jeod::NutationMars::update_rotation(), jeod::NutationJ2000::update_rotation(), and update_time().

8.7.5.2 double jeod::PlanetRotation::DAYTOJULIANCENT [protected]

Inverse of JULIANCENTTODAY.

trick_units(–)

Definition at line 112 of file planet_rotation.hh.

Referenced by PlanetRotation().

8.7.5.3 double jeod::PlanetRotation::DEGTORAD [protected]

Inverse of RADTODEG.

trick_units(radian/degree)

Definition at line 88 of file planet_rotation.hh.

Referenced by PlanetRotation(), jeod::PrecessionJ2000::update_rotation(), jeod::RotationJ2000::update_rotation(), and jeod::NutationJ2000::update_rotation().

8.7.5.4 double jeod::PlanetRotation::DEGTOSEC [protected]

Convert from degrees to arcseconds.

trick_units(arcsecond/degree)

Definition at line 92 of file planet_rotation.hh.

Referenced by PlanetRotation(), and jeod::PrecessionJ2000::update_rotation().

8.7.5.5 double jeod::PlanetRotation::JULIANCENTTODAY [protected]

Convert from julian centuries to julian days.

trick_units(–)

Definition at line 108 of file planet_rotation.hh.

Referenced by PlanetRotation().

8.7.5.6 double jeod::PlanetRotation::JULIANDAYTOSEC [protected]

Convert from julian day to seconds.

trick_units(s/day)

Definition at line 100 of file planet_rotation.hh.

Referenced by PlanetRotation().

8.7.5.7 double jeod::PlanetRotation::RADTODEG [protected]

Convert from radians to degrees.

trick_units(degree/radian)

Definition at line 84 of file planet_rotation.hh.

Referenced by PlanetRotation().

8.7.5.8 double jeod::PlanetRotation::rotation[3][3]

The transformation matrix outputted by the model after update is called.

trick_units(–)

Definition at line 67 of file planet_rotation.hh.

Referenced by get_rotation(), get_rotation_transpose(), PlanetRotation(), jeod::PlanetRNP::propagate_rnp(), jeod::PlanetRNP::update_rnp(), jeod::PrecessionJ2000::update_rotation(), jeod::PolarMotionJ2000::update_rotation(), jeod::RotationMars::update_rotation(), jeod::RotationJ2000::update_rotation(), jeod::PrecessionMars::update_rotation(), jeod::NutationMars::update_rotation(), and jeod::NutationJ2000::update_rotation().

8.7.5.9 double jeod::PlanetRotation::SECTODEG `[protected]`

Inverse of DEGTOSEC.

trick_units(degree/arcsecond)

Definition at line 96 of file planet_rotation.hh.

Referenced by PlanetRotation().

8.7.5.10 double jeod::PlanetRotation::SECTOJULIANDAY `[protected]`

Inverse of JULIANDAYTOSEC.

trick_units(day/s)

Definition at line 104 of file planet_rotation.hh.

Referenced by PlanetRotation().

The documentation for this class was generated from the following files:

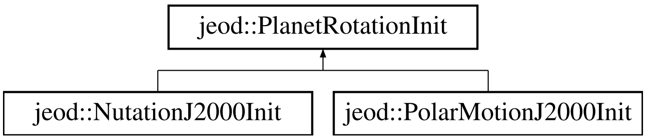
- planet_rotation.hh
- planet_rotation.cc

8.8 jeod::PlanetRotationInit Class Reference

The generic base class for all initializing classes for PlanetRotation derived classes.

```
#include <planet_rotation_init.hh>
```

Inheritance diagram for jeod::PlanetRotationInit:



Public Member Functions

- PlanetRotationInit ()

  constructor
- virtual ∼PlanetRotationInit ()

  destructor

Private Member Functions

- PlanetRotationInit & operator= (const PlanetRotationInit &rhs)
- PlanetRotationInit (const PlanetRotationInit &rhs)

Friends

- class InputProcessor
- void init_attrjeod__PlanetRotationInit ()

8.8.1 Detailed Description

The generic base class for all initializing classes for PlanetRotation derived classes.

Definition at line 52 of file planet_rotation_init.hh.

8.8.2 Constructor & Destructor Documentation

8.8.2.1 jeod::PlanetRotationInit::PlanetRotationInit (void)

constructor

Definition at line 47 of file planet_rotation_init.cc.

8.8.2.2 jeod::PlanetRotationInit::∼PlanetRotationInit (void) [virtual]

destructor

Definition at line 56 of file planet_rotation_init.cc.

8.8.2.3 jeod::PlanetRotationInit::PlanetRotationInit (const **PlanetRotationInit** & *rhs*) [private]

8.8.3 Member Function Documentation

8.8.3.1 **PlanetRotationInit**& jeod::PlanetRotationInit::operator= (const **PlanetRotationInit** & *rhs*) [private]

8.8.4 Friends And Related Function Documentation

8.8.4.1 void init_attrjeod__PlanetRotationInit ( ) [friend]

8.8.4.2 friend class InputProcessor [friend]

Definition at line 54 of file planet_rotation_init.hh.

The documentation for this class was generated from the following files:

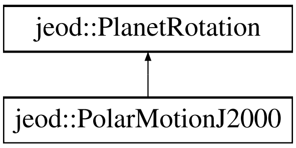
- planet_rotation_init.hh
- planet_rotation_init.cc

8.9 jeod::PolarMotionJ2000 Class Reference

Implements the polar motion portion of the J2000 RNP.

`#include <polar_motion_j2000.hh>`

Inheritance diagram for jeod::PolarMotionJ2000:



Public Member Functions

- PolarMotionJ2000 ()

    Default constructor.
- virtual ∼PolarMotionJ2000 ()

    Destructor.
- virtual void update_rotation ()

    PolarMotionJ2000 specific implementaiton of update_rotation from PlanetRotation.
- virtual void initialize (PlanetRotationInit ∗init)

    Initialize the coefficients of PolarMotionJ2000.

Data Fields

- double xp

    Current X Polar coordinate.
- double yp

    Current Y Polar coordinate.
- double ∗ xp_tbl

    X Polar coordinate table.
- double ∗ yp_tbl

    Y Polar coordinate table.
- double ∗ polar_mjd

    Independent variable for the XY coordinate table.
- bool override_table

    If true, do no table lookup and use the currently set xp and yp.
- unsigned int last_table_index

    Size - 1 of xp_tbl, yp_tbl and polar_mjd (last index)
- bool warn_table

    Have we warned about being off the table end?

Private Member Functions

- PolarMotionJ2000 & operator= (const PolarMotionJ2000 &rhs)
- PolarMotionJ2000 (const PolarMotionJ2000 &rhs)

Friends

- class InputProcessor
- void init_attrjeod__PolarMotionJ2000 ()

Additional Inherited Members

8.9.1 Detailed Description

Implements the polar motion portion of the J2000 RNP.

Definition at line 58 of file polar_motion_j2000.hh.

8.9.2 Constructor & Destructor Documentation

8.9.2.1 jeod::PolarMotionJ2000::PolarMotionJ2000 (void)

Default constructor.

Initializes all data.

Definition at line 68 of file polar_motion_j2000.cc.

8.9.2.2 jeod::PolarMotionJ2000::∼PolarMotionJ2000 (void) [virtual]

Destructor.

Definition at line 86 of file polar_motion_j2000.cc.

References polar_mjd, xp_tbl, and yp_tbl.

8.9.2.3 jeod::PolarMotionJ2000::PolarMotionJ2000 (const PolarMotionJ2000 & *rhs*) [private]

8.9.3 Member Function Documentation

8.9.3.1 void jeod::PolarMotionJ2000::initialize (PlanetRotationInit ∗ *init*) [virtual]

Initialize the coefficients of PolarMotionJ2000.

init must be of type PolarMotionJ2000Init or a fail message will occur.

Parameters

in	*init*	PolarMotionJ2000Init with needed coefficients

Reimplemented from jeod::PlanetRotation.

Definition at line 214 of file polar_motion_j2000.cc.

References jeod::RNPMessages::initialization_error, last_table_index, jeod::PolarMotionJ2000Init::last_table_index, override_table, jeod::PolarMotionJ2000Init::override_table, polar_mjd, jeod::PolarMotionJ2000Init::polar_mjd, xp, jeod::PolarMotionJ2000Init::xp, xp_tbl, jeod::PolarMotionJ2000Init::xp_tbl, yp, jeod::PolarMotionJ2000Init::yp, yp_tbl, and jeod::PolarMotionJ2000Init::yp_tbl.

8.9.3.2 PolarMotionJ2000& jeod::PolarMotionJ2000::operator= (const PolarMotionJ2000 & *rhs*) [private]

8.9.3.3 void jeod::PolarMotionJ2000::update_rotation (void) [virtual]

PolarMotionJ2000 specific implementaiton of update_rotation from PlanetRotation.

Reimplemented from jeod::PlanetRotation.

Definition at line 109 of file polar_motion_j2000.cc.

References jeod::PlanetRotation::current_time, last_table_index, override_table, polar_mjd, jeod::RNPMessages::polar_motion_table_warning, jeod::PlanetRotation::rotation, warn_table, xp, xp_tbl, yp, and yp_tbl.

8.9.4 Friends And Related Function Documentation

8.9.4.1 void init_attrjeod__PolarMotionJ2000 ( ) [friend]

8.9.4.2 friend class InputProcessor [friend]

Definition at line 60 of file polar_motion_j2000.hh.

8.9.5 Field Documentation

8.9.5.1 unsigned int jeod::PolarMotionJ2000::last_table_index

Size - 1 of xp_tbl, yp_tbl and polar_mjd (last index)

trick_units(count)

Definition at line 92 of file polar_motion_j2000.hh.

Referenced by initialize(), and update_rotation().

8.9.5.2 bool jeod::PolarMotionJ2000::override_table

If true, do no table lookup and use the currently set xp and yp.

trick_units(--)

Definition at line 88 of file polar_motion_j2000.hh.

Referenced by initialize(), and update_rotation().

8.9.5.3 double∗ jeod::PolarMotionJ2000::polar_mjd

Independent variable for the XY coordinate table.

trick_units(--)

Definition at line 83 of file polar_motion_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼PolarMotionJ2000().

8.9.5.4 bool jeod::PolarMotionJ2000::warn_table

Have we warned about being off the table end?

trick_units(--)

Definition at line 96 of file polar_motion_j2000.hh.

Referenced by update_rotation().

8.9.5.5 double jeod::PolarMotionJ2000::xp

Current X Polar coordinate.

trick_units(radian)

Definition at line 67 of file polar_motion_j2000.hh.

Referenced by initialize(), and update_rotation().

8.9.5.6 double∗ jeod::PolarMotionJ2000::xp_tbl

X Polar coordinate table.

trick_units(radian)

Definition at line 75 of file polar_motion_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼PolarMotionJ2000().

8.9.5.7 double jeod::PolarMotionJ2000::yp

Current Y Polar coordinate.

trick_units(radian)

Definition at line 71 of file polar_motion_j2000.hh.

Referenced by initialize(), and update_rotation().

8.9.5.8 double∗ jeod::PolarMotionJ2000::yp_tbl

Y Polar coordinate table.

trick_units(radian)

Definition at line 79 of file polar_motion_j2000.hh.

Referenced by initialize(), update_rotation(), and ∼PolarMotionJ2000().

The documentation for this class was generated from the following files:

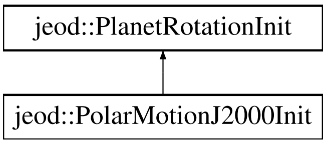
- polar_motion_j2000.hh
- polar_motion_j2000.cc

8.10 jeod::PolarMotionJ2000Init Class Reference

Initializes the PolarMotionJ2000 object.

`#include <polar_motion_j2000_init.hh>`

Inheritance diagram for jeod::PolarMotionJ2000Init:



Public Member Functions

- PolarMotionJ2000Init ()

  constructor.
- virtual ∼PolarMotionJ2000Init ()

  Destructor.

Data Fields

- double xp

  Current X Polar coordinate.
- double yp

  Current Y Polar coordinate.
- double ∗ xp_tbl

  X Polar coordinate table.
- double ∗ yp_tbl

  Y Polar coordinate table.
- double ∗ polar_mjd

  Independent variable for the XY coordinate table.
- bool override_table

  If true, do no table lookup and use the currently set xp and yp.
- unsigned int last_table_index

  Size - 1 of xp_tbl, yp_tbl and polar_mjd (last index)

Private Member Functions

- PolarMotionJ2000Init & operator= (const PolarMotionJ2000Init &rhs)
- PolarMotionJ2000Init (const PolarMotionJ2000Init &rhs)

Friends

- class InputProcessor
- void init_attrjeod__PolarMotionJ2000Init ()

8.10.1 Detailed Description

Initializes the PolarMotionJ2000 object.

Definition at line 58 of file polar_motion_j2000_init.hh.

8.10.2 Constructor & Destructor Documentation

8.10.2.1 jeod::PolarMotionJ2000Init::PolarMotionJ2000Init (void)

constructor.

Initializes all data.

Definition at line 58 of file polar_motion_j2000_init.cc.

8.10.2.2 jeod::PolarMotionJ2000Init::∼PolarMotionJ2000Init (void) [virtual]

Destructor.

Definition at line 75 of file polar_motion_j2000_init.cc.

References polar_mjd, xp_tbl, and yp_tbl.

8.10.2.3 jeod::PolarMotionJ2000Init::PolarMotionJ2000Init (const PolarMotionJ2000Init & *rhs*) [private]

8.10.3 Member Function Documentation

8.10.3.1 PolarMotionJ2000Init& jeod::PolarMotionJ2000Init::operator= (const PolarMotionJ2000Init & *rhs*) [private]

8.10.4 Friends And Related Function Documentation

8.10.4.1 void init_attrjeod__PolarMotionJ2000Init ( ) [friend]

8.10.4.2 friend class InputProcessor [friend]

Definition at line 60 of file polar_motion_j2000_init.hh.

8.10.5 Field Documentation

8.10.5.1 unsigned int jeod::PolarMotionJ2000Init::last_table_index

Size - 1 of xp_tbl, yp_tbl and polar_mjd (last index)

trick_units(count)

Definition at line 94 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize(), jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize(), and jeod::PolarMotionJ2000::initialize().

8.10.5.2 bool jeod::PolarMotionJ2000Init::override_table

If true, do no table lookup and use the currently set xp and yp.

trick_units(–)

Definition at line 90 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize(), jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize(), and jeod::PolarMotionJ2000::initialize().

8.10.5.3 double∗ jeod::PolarMotionJ2000Init::polar_mjd

Independent variable for the XY coordinate table.

trick_units(–)

Definition at line 85 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize(), jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize(), jeod::PolarMotionJ2000::initialize(), and ∼PolarMotionJ2000Init().

8.10.5.4 double jeod::PolarMotionJ2000Init::xp

Current X Polar coordinate.

trick_units(radian)

Definition at line 69 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000::initialize().

8.10.5.5 double∗ jeod::PolarMotionJ2000Init::xp_tbl

X Polar coordinate table.

trick_units(radian)

Definition at line 77 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize(), jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize(), jeod::PolarMotionJ2000::initialize(), and ∼PolarMotionJ2000Init().

8.10.5.6 double jeod::PolarMotionJ2000Init::yp

Current Y Polar coordinate.

trick_units(radian)

Definition at line 73 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000::initialize().

8.10.5.7 double∗ jeod::PolarMotionJ2000Init::yp_tbl

Y Polar coordinate table.

trick_units(radian)

Definition at line 81 of file polar_motion_j2000_init.hh.

Referenced by jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize(), jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize(), jeod::PolarMotionJ2000::initialize(), and ∼PolarMotionJ2000Init().

The documentation for this class was generated from the following files:

- polar_motion_j2000_init.hh
- polar_motion_j2000_init.cc

8.11 jeod::PolarMotionJ2000Init_xpyp_daily_default_data Class Reference

```
#include <xpyp_daily.hh>
```

Public Member Functions

- void initialize (PolarMotionJ2000Init ∗)

8.11.1 Detailed Description

Definition at line 18 of file xpyp_daily.hh.

8.11.2 Member Function Documentation

8.11.2.1 void jeod::PolarMotionJ2000Init_xpyp_daily_default_data::initialize (PolarMotionJ2000Init ∗ *PolarMotionJ2000Init_ptr*)

Definition at line 38 of file xpyp_daily.cc.

References jeod::PolarMotionJ2000Init::last_table_index, jeod::PolarMotionJ2000Init::override_table, jeod::PolarMotionJ2000Init::polar_mjd, jeod::PolarMotionJ2000Init::xp_tbl, and jeod::PolarMotionJ2000Init::yp_tbl.

The documentation for this class was generated from the following files:

- xpyp_daily.hh
- xpyp_daily.cc

8.12 jeod::PolarMotionJ2000Init_xpyp_monthly_default_data Class Reference

```
#include <xpyp_monthly.hh>
```

Public Member Functions

- void initialize (PolarMotionJ2000Init ∗)

8.12.1 Detailed Description

Definition at line 19 of file xpyp_monthly.hh.

8.12.2 Member Function Documentation

8.12.2.1 void jeod::PolarMotionJ2000Init_xpyp_monthly_default_data::initialize (**PolarMotionJ2000Init** ∗ *PolarMotionJ2000Init_ptr*)

Definition at line 38 of file xpyp_monthly.cc.

References jeod::PolarMotionJ2000Init::last_table_index, jeod::PolarMotionJ2000Init::override_table, jeod::PolarMotionJ2000Init::polar_mjd, jeod::PolarMotionJ2000Init::xp_tbl, and jeod::PolarMotionJ2000Init::yp_tbl.

The documentation for this class was generated from the following files:

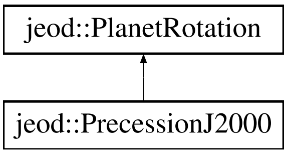
- xpyp_monthly.hh
- xpyp_monthly.cc

8.13 jeod::PrecessionJ2000 Class Reference

Implements the precession portion of the J2000 RNP.

```
#include <precession_j2000.hh>
```

Inheritance diagram for jeod::PrecessionJ2000:



Public Member Functions

- PrecessionJ2000 ()

  constructor
- virtual ∼PrecessionJ2000 ()

  destructor

- virtual void update_rotation ()

  Precession J2000 specific implementation of update_rotation, inherited from Planetrotation.

Private Member Functions

- PrecessionJ2000 & operator= (const PrecessionJ2000 &rhs)
- PrecessionJ2000 (const PrecessionJ2000 &rhs)

Friends

- class InputProcessor
- void init_attrjeod__PrecessionJ2000 ()

Additional Inherited Members

8.13.1 Detailed Description

Implements the precession portion of the J2000 RNP.

Definition at line 60 of file precession_j2000.hh.

8.13.2 Constructor & Destructor Documentation

8.13.2.1 jeod::PrecessionJ2000::PrecessionJ2000 (void)

constructor

Definition at line 54 of file precession_j2000.cc.

8.13.2.2 jeod::PrecessionJ2000::∼PrecessionJ2000 (void) [virtual]

destructor

Definition at line 62 of file precession_j2000.cc.

8.13.2.3 jeod::PrecessionJ2000::PrecessionJ2000 (const PrecessionJ2000 & *rhs*) [private]

8.13.3 Member Function Documentation

8.13.3.1 PrecessionJ2000& jeod::PrecessionJ2000::operator= (const PrecessionJ2000 & *rhs*) [private]

8.13.3.2 void jeod::PrecessionJ2000::update_rotation (void) [virtual]

Precession J2000 specific implementation of update_rotation, inherited from Planetrotation.

Reimplemented from jeod::PlanetRotation.

Definition at line 72 of file precession_j2000.cc.

References jeod::PlanetRotation::current_time, jeod::PlanetRotation::DEGTORAD, jeod::PlanetRotation::DEGTOSEC, and jeod::PlanetRotation::rotation.

8.13.4 Friends And Related Function Documentation

8.13.4.1 void init_attrjeod__PrecessionJ2000 ( ) [friend]

8.13.4.2 friend class InputProcessor [friend]

Definition at line 62 of file precession_j2000.hh.

The documentation for this class was generated from the following files:

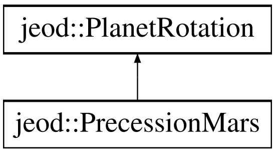
- precession_j2000.hh
- precession_j2000.cc

8.14 jeod::PrecessionMars Class Reference

Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

`#include <precession_mars.hh>`

Inheritance diagram for jeod::PrecessionMars:



Public Member Functions

- PrecessionMars ()

  Default constructor.
- virtual ∼PrecessionMars ()

  Destructor.
- virtual void update_rotation ()

  PrecessionMars specific implementation of update_rotation, to calculate precession.
- void compute_fixed_matrices ()

  Calculate constant rotation matrices resulting from N and J.

Data Fields

- NutationMars ∗ nutation

  Pointer to the Mars nutation object, used to access nutation in longitude information.
- double psi_at_j2000

  The (constant) precession angle of Mars at the J2000 epoch.
- double psi_dot

  The (constant) simple precession rate of Mars.
- double psi_precess

  The most recent calculated value of the precession angle for Mars, measured since J2000 epoch.
- double N

  The (constant) angle from the J2000 vernal equinox to the node of the Mars mean orbit and ICRF x-y plane.
- double J

  The (constant) inclination of the Mars mean orbit relative to the ICRF x-y plane.

Private Member Functions

- PrecessionMars & operator= (const PrecessionMars &rhs)
- PrecessionMars (const PrecessionMars &rhs)

Private Attributes

- double NJ_matrix [3][3]

  The (constant) rotation matrix calculated from N and J.

Friends

- class InputProcessor
- void init_attrjeod__PrecessionMars ()

Additional Inherited Members

8.14.1 Detailed Description

Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

Definition at line 62 of file precession_mars.hh.

8.14.2 Constructor & Destructor Documentation

8.14.2.1 jeod::PrecessionMars::PrecessionMars (void)

Default constructor.

Definition at line 63 of file precession_mars.cc.

References NJ_matrix.

8.14.2.2 jeod::PrecessionMars::∼PrecessionMars (void) [virtual]

Destructor.

Definition at line 80 of file precession_mars.cc.

8.14.2.3 jeod::PrecessionMars::PrecessionMars (const **PrecessionMars** & *rhs*) [private]

8.14.3 Member Function Documentation

8.14.3.1 void jeod::PrecessionMars::compute_fixed_matrices (void)

Calculate constant rotation matrices resulting from N and J.

Definition at line 142 of file precession_mars.cc.

References J, N, and NJ_matrix.

Referenced by jeod::RNPMars::initialize().

8.14.3.2 PrecessionMars& jeod::PrecessionMars::operator= (const PrecessionMars & *rhs*) [private]

8.14.3.3 void jeod::PrecessionMars::update_rotation (void) [virtual]

PrecessionMars specific implementation of update_rotation, to calculate precession.

Reimplemented from jeod::PlanetRotation.

Definition at line 92 of file precession_mars.cc.

References jeod::PlanetRotation::current_time, NJ_matrix, nutation, jeod::NutationMars::nutation_in_longitude, psi_at_j2000, psi_dot, psi_precess, jeod::PlanetRotation::rotation, and jeod::RNPMessages::setup_error.

8.14.4 Friends And Related Function Documentation

8.14.4.1 void init_attrjeod__PrecessionMars ( ) [friend]

8.14.4.2 friend class InputProcessor [friend]

Definition at line 64 of file precession_mars.hh.

8.14.5 Field Documentation

8.14.5.1 double jeod::PrecessionMars::J

The (constant) inclination of the Mars mean orbit relative to the ICRF x-y plane.

trick_units(radian)

Definition at line 101 of file precession_mars.hh.

Referenced by compute_fixed_matrices(), and jeod::RNPMars_rnp_mars_default_data::initialize().

8.14.5.2 double jeod::PrecessionMars::N

The (constant) angle from the J2000 vernal equinox to the node of the Mars mean orbit and ICRF x-y plane.

trick_units(radian)

Definition at line 95 of file precession_mars.hh.

Referenced by compute_fixed_matrices(), and jeod::RNPMars_rnp_mars_default_data::initialize().

8.14.5.3 double jeod::PrecessionMars::NJ_matrix[3][3] [private]

The (constant) rotation matrix calculated from N and J.

trick_units(–)

Definition at line 110 of file precession_mars.hh.

Referenced by compute_fixed_matrices(), PrecessionMars(), and update_rotation().

8.14.5.4 NutationMars∗ jeod::PrecessionMars::nutation

Pointer to the Mars nutation object, used to access nutation in longitude information.

Will be NULL (automatically) if anything but Full_Term_RNP is set in the RNPMars object.trick_units(–)

Definition at line 73 of file precession_mars.hh.

Referenced by jeod::RNPMars::initialize(), and update_rotation().

8.14.5.5 double jeod::PrecessionMars::psi_at_j2000

The (constant) precession angle of Mars at the J2000 epoch.

trick_units(radian)

Definition at line 78 of file precession_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.14.5.6 double jeod::PrecessionMars::psi_dot

The (constant) simple precession rate of Mars.

trick_units(radian/s)

Definition at line 83 of file precession_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.14.5.7 double jeod::PrecessionMars::psi_precess

The most recent calculated value of the precession angle for Mars, measured since J2000 epoch.

trick_units(radian)

Definition at line 89 of file precession_mars.hh.

Referenced by update_rotation().

The documentation for this class was generated from the following files:

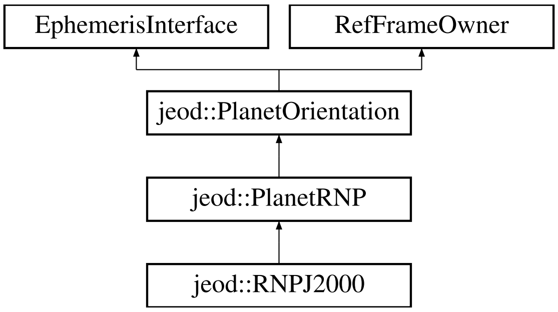
- precession_mars.hh
- precession_mars.cc

8.15 jeod::RNPJ2000 Class Reference

Implements the J2000 RNP model using the generic RNP framework.

`#include <rnp_j2000.hh>`

Inheritance diagram for jeod::RNPJ2000:



Public Member Functions

- RNPJ2000 ()

  default constructor.
- virtual ∼RNPJ2000 ()

Destructor.

- void initialize (DynManager &manager)

  Apply the various options, including fidelity of RNP and if polar motion is enabled or not, then call the base class initializer.

- void update_rnp (TimeTT &time_tt, TimeGMST &time_gmst, TimeUT1 &time_ut1)

  Updates the complete RNP and supplies it to the Dynamics Manager.

- void update_axial_rotation (TimeGMST &time_gmst)

  Updates the axial rotation portion of RNP and supplies the entire RNP to the Dynamics Manager.

- virtual double timestamp () const
- virtual const char ∗ get_name () const

  A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

- virtual void ephem_update ()

Data Fields

- RotationJ2000 RJ2000

  Earth J2000 rotation model.

- NutationJ2000 NJ2000

  Earth J2000 nutation model.

- PrecessionJ2000 PJ2000

  Earth J2000 precession model.

- PolarMotionJ2000 PMJ2000

  Earth J2000 polar motion model.

- char internal_name [9]

  The hard coded internal name to be returned on calling the overridden EphemerisInterface function "get_name".

Private Member Functions

- void get_dyn_time_ptr (TimeGMST &gmst)
- RNPJ2000 & operator= (const RNPJ2000 &rhs)
- RNPJ2000 (const RNPJ2000 &rhs)

Private Attributes

- TimeGMST ∗ gmst_ptr

  Pointer to the TimeGMST used to update this object when ephem_update is invoked.

- TimeDyn ∗ time_dyn_ptr

  Pointer to the TimeDyn object, used to time stamp the reference frame when it is being updated.

- double last_updated_time_full

  The last update time, when updated through update_rnp, for the RNP, referencing TimeDyn.seconds .

- bool never_updated_full

  Indicates that last_updated_time_full has never been populated, and that the update must be done regardless of given time.

- double last_updated_time_rotational

  The last update time, when updated through update_axial_rotation, referencing TimeDyn.seconds .

- bool never_updated_rotational

  Indicates that last_updated_time_rotational has never been populated, and that the update must be done regardless of given time.

Friends

- class InputProcessor
- void init_attrjeod__RNPJ2000 ()

Additional Inherited Members

8.15.1 Detailed Description

Implements the J2000 RNP model using the generic RNP framework.

Definition at line 73 of file include/rnp_j2000.hh.

8.15.2 Constructor & Destructor Documentation

8.15.2.1 jeod::RNPJ2000::RNPJ2000 (void)

default constructor.

Initialize all data

Definition at line 79 of file rnp_j2000.cc.

References internal_name, NJ2000, jeod::PlanetRNP::nutation, PJ2000, PMJ2000, jeod::PlanetRNP::polar_motion, jeod::PlanetRNP::precession, RJ2000, and jeod::PlanetRNP::rotation.

8.15.2.2 jeod::RNPJ2000::∼RNPJ2000 (void) [virtual]

Destructor.

Definition at line 104 of file rnp_j2000.cc.

8.15.2.3 jeod::RNPJ2000::RNPJ2000 (const **RNPJ2000** & *rhs*) [private]

8.15.3 Member Function Documentation

8.15.3.1 void jeod::RNPJ2000::ephem_update ( ) [virtual]

Definition at line 334 of file rnp_j2000.cc.

References jeod::PlanetOrientation::active, gmst_ptr, jeod::PlanetOrientation::orient_interface, jeod::RNPMessages::setup_error, and jeod::PlanetRNP::update_axial_rotation().

8.15.3.2 void jeod::RNPJ2000::get_dyn_time_ptr (TimeGMST & *gmst*) [private]

Definition at line 355 of file rnp_j2000.cc.

References jeod::RNPMessages::setup_error, and time_dyn_ptr.

Referenced by update_axial_rotation(), and update_rnp().

8.15.3.3 const char ∗ jeod::RNPJ2000::get_name ( ) const [virtual]

A re-declaration of the pure virtual function in order to convince trick that yes, this is a pure virtual class.

Returns

Planet name.

Implements jeod::PlanetRNP.

Definition at line 321 of file rnp_j2000.cc.

References internal_name.

8.15.3.4 void jeod::RNPJ2000::initialize (DynManager & *dyn_manager*) `[virtual]`

Apply the various options, including fidelity of RNP and if polar motion is enabled or not, then call the base class initializer.

Note that this function will still run even if the active flag is set to false. Additionally, note that this function does not update the rotation matrix between inertial and planet fixed. It only sets up the object to work with the DynManager. update_rnp must be called to update the RNP matrix. This function will also cache of TimeGMST from the given TimeManager

Parameters

`in,out`	*dyn_manager*	DynManager where the planet attitude to be updated is contained

Reimplemented from jeod::PlanetOrientation.

Definition at line 123 of file rnp_j2000.cc.

References jeod::PlanetRNP::ConstantNP, jeod::PlanetRNP::FullRNP, jeod::PlanetOrientation::initialize(), NJ2000, jeod::RotationJ2000::nutation, jeod::PlanetOrientation::planet_omega, jeod::RotationJ2000::planet_rotational_velocity, RJ2000, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::RotationOnly, and jeod::RotationJ2000::use_full_rnp.

8.15.3.5 RNPJ2000& jeod::RNPJ2000::operator= (const RNPJ2000 & *rhs*) `[private]`

8.15.3.6 double jeod::RNPJ2000::timestamp ( ) const `[virtual]`

Definition at line 317 of file rnp_j2000.cc.

References last_updated_time_rotational.

8.15.3.7 void jeod::RNPJ2000::update_axial_rotation (TimeGMST & *time_gmst*)

Updates the axial rotation portion of RNP and supplies the entire RNP to the Dynamics Manager.

Parameters

`in`	*time_gmst*	current time in the GMST time standard Units: The

Definition at line 265 of file rnp_j2000.cc.

References jeod::PlanetOrientation::active, jeod::PlanetRNP::FullRNP, get_dyn_time_ptr(), last_updated_time_rotational, never_updated_rotational, jeod::PlanetOrientation::planet, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::rotation, time_dyn_ptr, jeod::PlanetRNP::update_axial_rotation(), and jeod::PlanetRotation::update_time().

8.15.3.8 void jeod::RNPJ2000::update_rnp (TimeTT & *time_tt,* TimeGMST & *time_gmst,* TimeUT1 & *time_ut1*)

Updates the complete RNP and supplies it to the Dynamics Manager.

Parameters

in	*time_tt*	The current time in the TT time standard
in	*time_gmst*	current time in the GMST time standard Units: The
in	*time_ut1*	current time in the UT1 time standard Units: The

Definition at line 166 of file rnp_j2000.cc.

References jeod::PlanetOrientation::active, jeod::PlanetRNP::enable_polar, jeod::PlanetRNP::FullRNP, get_dyn_time_ptr(), gmst_ptr, last_updated_time_full, last_updated_time_rotational, never_updated_full, never_updated_rotational, jeod::PlanetRNP::nutation, jeod::PlanetOrientation::planet, jeod::PlanetRNP::polar_motion, jeod::PlanetRNP::precession, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::rotation, time_dyn_ptr, jeod::PlanetRNP::update_rnp(), and jeod::PlanetRotation::update_time().

8.15.4 Friends And Related Function Documentation

8.15.4.1 void init_attrjeod__RNPJ2000 ( ) [friend]

8.15.4.2 friend class InputProcessor [friend]

Definition at line 75 of file include/rnp_j2000.hh.

8.15.5 Field Documentation

8.15.5.1 TimeGMST∗ jeod::RNPJ2000::gmst_ptr [private]

Pointer to the TimeGMST used to update this object when ephem_update is invoked.

trick_units(–)

Definition at line 154 of file include/rnp_j2000.hh.

Referenced by ephem_update(), and update_rnp().

8.15.5.2 char jeod::RNPJ2000::internal_name[9]

The hard coded internal name to be returned on calling the overridden EphemerisInterface function "get_name".

trick_units(–)

Definition at line 139 of file include/rnp_j2000.hh.

Referenced by get_name(), and RNPJ2000().

8.15.5.3 double jeod::RNPJ2000::last_updated_time_full [private]

The last update time, when updated through update_rnp, for the RNP, referencing TimeDyn.seconds .

If the time from time_dyn_ptr is the same as this update time, then the RNP will not be updated. This is to prevent unnecessary updating.trick_units(s)

Definition at line 169 of file include/rnp_j2000.hh.

Referenced by update_rnp().

8.15.5.4 double jeod::RNPJ2000::last_updated_time_rotational [private]

The last update time, when updated through update_axial_rotation, referencing TimeDyn.seconds .

If the time from time_dyn_ptr is the same as this update time, then the R component of RNP will not be updated. This is to prevent unnecessary updating.trick_units(s)

Definition at line 184 of file include/rnp_j2000.hh.

Referenced by timestamp(), update_axial_rotation(), and update_rnp().

8.15.5.5 bool jeod::RNPJ2000::never_updated_full [private]

Indicates that last_updated_time_full has never been populated, and that the update must be done regardless of given time.

trick_units(–)

Definition at line 175 of file include/rnp_j2000.hh.

Referenced by update_rnp().

8.15.5.6 bool jeod::RNPJ2000::never_updated_rotational [private]

Indicates that last_updated_time_rotational has never been populated, and that the update must be done regardless of given time.

trick_units(–)

Definition at line 190 of file include/rnp_j2000.hh.

Referenced by update_axial_rotation(), and update_rnp().

8.15.5.7 NutationJ2000 jeod::RNPJ2000::NJ2000

Earth J2000 nutation model.

trick_units(–)

Definition at line 88 of file include/rnp_j2000.hh.

Referenced by initialize(), and RNPJ2000().

8.15.5.8 PrecessionJ2000 jeod::RNPJ2000::PJ2000

Earth J2000 precession model.

trick_units(–)

Definition at line 92 of file include/rnp_j2000.hh.

Referenced by RNPJ2000().

8.15.5.9 PolarMotionJ2000 jeod::RNPJ2000::PMJ2000

Earth J2000 polar motion model.

trick_units(–)

Definition at line 96 of file include/rnp_j2000.hh.

Referenced by RNPJ2000().

8.15.5.10 RotationJ2000 jeod::RNPJ2000::RJ2000

Earth J2000 rotation model.

trick_units(–)

Definition at line 84 of file include/rnp_j2000.hh.

Referenced by initialize(), and RNPJ2000().

8.15.5.11 TimeDyn∗ jeod::RNPJ2000::time_dyn_ptr `[private]`

Pointer to the TimeDyn object, used to time stamp the reference frame when it is being updated.

trick_units(–)

Definition at line 160 of file include/rnp_j2000.hh.

Referenced by get_dyn_time_ptr(), update_axial_rotation(), and update_rnp().

The documentation for this class was generated from the following files:

- include/rnp_j2000.hh
- rnp_j2000.cc

8.16 jeod::RNPJ2000_rnp_j2000_default_data Class Reference

`#include <rnp_j2000.hh>`

Public Member Functions

- void initialize (RNPJ2000 ∗)

8.16.1 Detailed Description

Definition at line 18 of file data/include/rnp_j2000.hh.

8.16.2 Member Function Documentation

8.16.2.1 void jeod::RNPJ2000_rnp_j2000_default_data::initialize (**RNPJ2000** ∗ *RNPJ2000_ptr*)

Definition at line 44 of file data_rnp_j2000.cc.

References jeod::PlanetRNP::enable_polar, jeod::PlanetRNP::FullRNP, jeod::PlanetOrientation::name, jeod::-PlanetOrientation::planet_omega, and jeod::PlanetRNP::rnp_type.

The documentation for this class was generated from the following files:

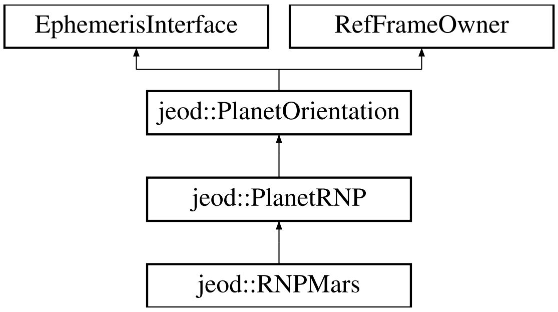
- data/include/rnp_j2000.hh
- data_rnp_j2000.cc

8.17 jeod::RNPMars Class Reference

Implements the "Pathfinder" Mars RNP model using the generic RNP framework.

`#include <rnp_mars.hh>`

Inheritance diagram for jeod::RNPMars:



Public Member Functions

- RNPMars ()

  Default constructor.
- virtual ∼RNPMars ()

  Destructor.
- void initialize (DynManager &manager)

  Perform setup of the object, then call the base class initializer.
- void update_rnp (TimeTT &time_tt)

  Update the complete RNP and supply it to the Dynamics Manager.
- void update_axial_rotation (TimeTT &time_tt)

  Update rotation portion of RNP and supply RNP to dynamics manager.
- virtual double timestamp () const

  Return the last time at which the RNP was updated.
- virtual const char ∗ get_name () const

  Return the internal name of the object.
- virtual void ephem_update ()

  Define 'alias' to call axial update function, for polymorphism.

Data Fields

- RotationMars RMars

  "Pathfinder" Mars rotation model.
- NutationMars NMars

  "Pathfinder" Mars nutation model.
- PrecessionMars PMars

  "Pathfinder" Mars precession model.
- char internal_name [8]

  The hard coded internal name to be returned on calling the overridden EphemerisInterface function "get_name".

Private Member Functions

- void get_dyn_time_ptr (TimeTT &time_tt)

  Get simulation time via a two-step pointer trail.
- RNPMars & operator= (const RNPMars &rhs)
- RNPMars (const RNPMars &rhs)

Private Attributes

- TimeTT ∗ tt_ptr

  Pointer to the TimeTT used to update this object when ephem_update is invoked.
- TimeDyn ∗ time_dyn_ptr

  Pointer to the TimeDyn object, used to time stamp the reference frame when it is being updated.
- double last_updated_time_full

  The last update time for the RNP, when updated through update_rnp.
- bool never_updated_full

  Indicates that last_updated_time_full has never been populated, and that the update must be done regardless of given time.
- double last_updated_time_rotational

  The last rotational update time, when updated through update_axial_rotation, referencing TimeDyn.seconds.
- bool never_updated_rotational

  Indicates that last_updated_time_rotational has never been populated, and that the update must be done regardless of given time.

Friends

- class InputProcessor
- void init_attrjeod__RNPMars ()

Additional Inherited Members

8.17.1 Detailed Description

Implements the "Pathfinder" Mars RNP model using the generic RNP framework.

Definition at line 67 of file include/rnp_mars.hh.

8.17.2 Constructor & Destructor Documentation

8.17.2.1 jeod::RNPMars::RNPMars (void)

Default constructor.

Definition at line 71 of file rnp_mars.cc.

References jeod::PlanetRNP::enable_polar, internal_name, NMars, jeod::PlanetRNP::nutation, PMars, jeod::PlanetRNP::polar_motion, jeod::PlanetRNP::precession, RMars, and jeod::PlanetRNP::rotation.

8.17.2.2 jeod::RNPMars::∼RNPMars ( ) [virtual]

Destructor.

Definition at line 104 of file rnp_mars.cc.

8.17.2.3 jeod::RNPMars::RNPMars (const RNPMars & *rhs*) [private]

8.17.3 Member Function Documentation

8.17.3.1 void jeod::RNPMars::ephem_update ( ) [virtual]

Define 'alias' to call axial update function, for polymorphism.

Definition at line 283 of file rnp_mars.cc.

References jeod::PlanetOrientation::active, jeod::PlanetOrientation::orient_interface, jeod::RNPMessages::setup_error, tt_ptr, and jeod::PlanetRNP::update_axial_rotation().

8.17.3.2 void jeod::RNPMars::get_dyn_time_ptr (TimeTT & *time_tt*) [private]

Get simulation time via a two-step pointer trail.

Parameters

in	*time_tt*	Current TT time

Definition at line 308 of file rnp_mars.cc.

References jeod::RNPMessages::setup_error, and time_dyn_ptr.

Referenced by update_axial_rotation(), and update_rnp().

8.17.3.3 const char ∗ jeod::RNPMars::get_name ( ) const [virtual]

Return the internal name of the object.

Implements jeod::PlanetRNP.

Definition at line 274 of file rnp_mars.cc.

References internal_name.

8.17.3.4 void jeod::RNPMars::initialize (DynManager & *dyn_manager*) [virtual]

Perform setup of the object, then call the base class initializer.

Parameters

in,out	*dyn_manager*	Ref to dynamics manager

Reimplemented from jeod::PlanetOrientation.

Definition at line 113 of file rnp_mars.cc.

References jeod::PrecessionMars::compute_fixed_matrices(), jeod::PlanetRNP::ConstantNP, jeod::PlanetRNP::FullRNP, jeod::PlanetOrientation::initialize(), NMars, jeod::PrecessionMars::nutation, jeod::RotationMars::nutation, jeod::PlanetOrientation::planet_omega, jeod::RotationMars::planet_rotational_velocity, PMars, RMars, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::RotationOnly, and jeod::RotationMars::use_full_rnp.

8.17.3.5 RNPMars& jeod::RNPMars::operator= (const RNPMars & *rhs*) [private]

8.17.3.6 double jeod::RNPMars::timestamp ( ) const [virtual]

Return the last time at which the RNP was updated.

Definition at line 265 of file rnp_mars.cc.

References last_updated_time_rotational.

8.17.3.7 void jeod::RNPMars::update_axial_rotation (TimeTT & *time_tt*)

Update rotation portion of RNP and supply RNP to dynamics manager.

Parameters

in	*time_tt*	Current TT time

Definition at line 211 of file rnp_mars.cc.

References jeod::PlanetOrientation::active, jeod::PlanetRNP::FullRNP, get_dyn_time_ptr(), last_updated_time_rotational, never_updated_rotational, jeod::PlanetOrientation::planet, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::rotation, time_dyn_ptr, jeod::PlanetRNP::update_axial_rotation(), and jeod::PlanetRotation::update_time().

8.17.3.8 void jeod::RNPMars::update_rnp (TimeTT & *time_tt*)

Update the complete RNP and supply it to the Dynamics Manager.

Parameters

in	*time_tt*	Current Terrestrial Time

Definition at line 148 of file rnp_mars.cc.

References jeod::PlanetOrientation::active, jeod::PlanetRNP::FullRNP, get_dyn_time_ptr(), last_updated_time_full, last_updated_time_rotational, never_updated_full, never_updated_rotational, jeod::PlanetRNP::nutation, jeod::PlanetOrientation::planet, jeod::PlanetRNP::precession, jeod::PlanetRNP::rnp_type, jeod::PlanetRNP::rotation, time_dyn_ptr, tt_ptr, jeod::PlanetRNP::update_rnp(), and jeod::PlanetRotation::update_time().

8.17.4 Friends And Related Function Documentation

8.17.4.1 void init_attrjeod__RNPMars ( ) [friend]

8.17.4.2 friend class InputProcessor [friend]

Definition at line 69 of file include/rnp_mars.hh.

8.17.5 Field Documentation

8.17.5.1 char jeod::RNPMars::internal_name[8]

The hard coded internal name to be returned on calling the overridden EphemerisInterface function "get_name".

trick_units(–)

Definition at line 92 of file include/rnp_mars.hh.

Referenced by get_name(), and RNPMars().

8.17.5.2 double jeod::RNPMars::last_updated_time_full [private]

The last update time for the RNP, when updated through update_rnp.

References TimeDyn.seconds. If the time from time_dyn_ptr is the same as this update time, then the RNP will not be updated; prevents unnecessary updating.trick_units(s)

Definition at line 113 of file include/rnp_mars.hh.

Referenced by update_rnp().

8.17.5.3 double jeod::RNPMars::last_updated_time_rotational [private]

The last rotational update time, when updated through update_axial_rotation, referencing TimeDyn.seconds.

If the time from time_dyn_ptr matches this update time, then the R component of the RNP will not be updated; prevents unnecessary updating.trick_units(s)

Definition at line 127 of file include/rnp_mars.hh.

Referenced by timestamp(), update_axial_rotation(), and update_rnp().

8.17.5.4 bool jeod::RNPMars::never_updated_full [private]

Indicates that last_updated_time_full has never been populated, and that the update must be done regardless of given time.

trick_units(–)

Definition at line 119 of file include/rnp_mars.hh.

Referenced by update_rnp().

8.17.5.5 bool jeod::RNPMars::never_updated_rotational [private]

Indicates that last_updated_time_rotational has never been populated, and that the update must be done regardless of given time.

trick_units(–)

Definition at line 133 of file include/rnp_mars.hh.

Referenced by update_axial_rotation(), and update_rnp().

8.17.5.6 NutationMars jeod::RNPMars::NMars

"Pathfinder" Mars nutation model.

trick_units(–)

Definition at line 81 of file include/rnp_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), initialize(), and RNPMars().

8.17.5.7 PrecessionMars jeod::RNPMars::PMars

"Pathfinder" Mars precession model.

trick_units(–)

Definition at line 86 of file include/rnp_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), initialize(), and RNPMars().

8.17.5.8 RotationMars jeod::RNPMars::RMars

"Pathfinder" Mars rotation model.

trick_units(–)

Definition at line 76 of file include/rnp_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), initialize(), and RNPMars().

8.17.5.9 TimeDyn* jeod::RNPMars::time_dyn_ptr [private]

Pointer to the TimeDyn object, used to time stamp the reference frame when it is being updated.

trick_units(–)

Definition at line 105 of file include/rnp_mars.hh.

Referenced by get_dyn_time_ptr(), update_axial_rotation(), and update_rnp().

8.17.5.10 TimeTT∗ jeod::RNPMars::tt_ptr `[private]`

Pointer to the TimeTT used to update this object when ephem_update is invoked.

trick_units(–)

Definition at line 99 of file include/rnp_mars.hh.

Referenced by ephem_update(), and update_rnp().

The documentation for this class was generated from the following files:

- include/rnp_mars.hh
- rnp_mars.cc

8.18 jeod::RNPMars_rnp_mars_default_data Class Reference

```
#include <rnp_mars.hh>
```

Public Member Functions

- void initialize (RNPMars ∗)

8.18.1 Detailed Description

Definition at line 18 of file data/include/rnp_mars.hh.

8.18.2 Member Function Documentation

8.18.2.1 void jeod::RNPMars_rnp_mars_default_data::initialize (**RNPMars** ∗ ***RNPMars_ptr***)

Definition at line 47 of file data_rnp_mars.cc.

References jeod::PlanetRNP::enable_polar, jeod::PlanetRNP::FullRNP, jeod::NutationMars::I_at_j2000, jeod::NutationMars::I_dot, jeod::NutationMars::I_m_orig, jeod::NutationMars::int_to_double, jeod::PrecessionMars::J, jeod::NutationMars::mean_anomaly_j2000, jeod::NutationMars::mean_motion, jeod::PrecessionMars::N, jeod::PlanetOrientation::name, jeod::RNPMars::NMars, jeod::RotationMars::phi_at_j2000, jeod::PlanetOrientation::planet_omega, jeod::RNPMars::PMars, jeod::PrecessionMars::psi_at_j2000, jeod::PrecessionMars::psi_dot, jeod::NutationMars::psi_m_orig, jeod::NutationMars::q_angle_j2000, jeod::RNPMars::RMars, and jeod::PlanetRNP::rnp_type.

The documentation for this class was generated from the following files:

- data/include/rnp_mars.hh
- data_rnp_mars.cc

8.19 jeod::RNPMessages Class Reference

Describes messages used in the RNP model.

```
#include <RNP_messages.hh>
```

Static Public Attributes

- static char const ∗ initialization_error

  Indicates an error during initialization.
- static char const ∗ fidelity_error

  Indicates a mismatch between the requested fidelity and what is available to the model.
- static char const ∗ setup_error

  Indicates an error during setup of the RNP model.
- static char const ∗ polar_motion_table_warning

  Indicates a problem with the interpolation table commonly found in polar motion implementations.

Private Member Functions

- RNPMessages (void)
- RNPMessages (const RNPMessages &rhs)
- RNPMessages & operator= (const RNPMessages &rhs)

Friends

- class InputProcessor
- void init_attrjeod__RNPMessages ()

8.19.1 Detailed Description

Describes messages used in the RNP model.

Definition at line 49 of file RNP_messages.hh.

8.19.2 Constructor & Destructor Documentation

8.19.2.1 jeod::RNPMessages::RNPMessages (void) [private]

8.19.2.2 jeod::RNPMessages::RNPMessages (const **RNPMessages** & *rhs*) [private]

8.19.3 Member Function Documentation

8.19.3.1 **RNPMessages**& jeod::RNPMessages::operator= (const **RNPMessages** & *rhs*) [private]

8.19.4 Friends And Related Function Documentation

8.19.4.1 void init_attrjeod__RNPMessages ( ) [friend]

8.19.4.2 friend class InputProcessor [friend]

Definition at line 51 of file RNP_messages.hh.

8.19.5 Field Documentation

8.19.5.1 char const ∗ jeod::RNPMessages::fidelity_error [static]

Initial value:

```
=
    "environment/RNP/"  "fidelity_error"
```

Indicates a mismatch between the requested fidelity and what is available to the model.

trick_units(–)

Definition at line 68 of file RNP_messages.hh.

Referenced by jeod::PlanetRNP::propagate_rnp(), and jeod::PlanetRNP::update_rnp().

8.19.5.2 char const * jeod::RNPMessages::initialization_error [static]

Initial value:

```
=
    "environment/RNP/"  "initialization_error"
```

Indicates an error during initialization.

trick_units(–)

Definition at line 62 of file RNP_messages.hh.

Referenced by jeod::PlanetOrientation::initialize(), jeod::PolarMotionJ2000::initialize(), and jeod::NutationJ2000::initialize().

8.19.5.3 char const * jeod::RNPMessages::polar_motion_table_warning [static]

Initial value:

```
=
    "environment/RNP/"  "polar_motion_table_warning"
```

Indicates a problem with the interpolation table commonly found in polar motion implementations.

trick_units(–)

Definition at line 81 of file RNP_messages.hh.

Referenced by jeod::PolarMotionJ2000::update_rotation().

8.19.5.4 char const * jeod::RNPMessages::setup_error [static]

Initial value:

```
=
    "environment/RNP/"  "setup_error"
```

Indicates an error during setup of the RNP model.

trick_units(–)

Definition at line 73 of file RNP_messages.hh.

Referenced by jeod::RNPJ2000::ephem_update(), jeod::RNPMars::ephem_update(), jeod::RNPJ2000::get_dyn_time_ptr(), jeod::RNPMars::get_dyn_time_ptr(), jeod::PlanetRNP::propagate_rnp(), jeod::PlanetRNP::update_axial_rotation(), jeod::PlanetRNP::update_rnp(), jeod::RotationMars::update_rotation(), jeod::RotationJ2000::update_rotation(), and jeod::PrecessionMars::update_rotation().

The documentation for this class was generated from the following files:

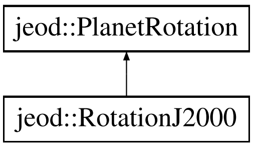
- RNP_messages.hh
- RNP_messages.cc

8.20 jeod::RotationJ2000 Class Reference

Implements the axial rotation portion of J2000 RNP.

`#include <rotation_j2000.hh>`

Inheritance diagram for jeod::RotationJ2000:



Public Member Functions

- RotationJ2000 ()

  default constructor, initialize low level data
- virtual ∼RotationJ2000 ()

  destructor
- virtual void update_rotation ()

  J2000 specific implementation of update_rotation, from PlanetRotation.

Data Fields

- double planet_rotational_velocity

  The nominal axial rotational velocity of the earth.
- NutationJ2000 ∗ nutation

  Pointer to the J2000 nutation object, used for get obliquity information out.
- bool use_full_rnp

  Tells the rotation object if it should use a full blown rotation formulation, or just use the time passed multiplied by the rotational velocity.
- double theta_gast

  The last theta_gast (angle the earth had axially rotated) calculated.
- double GMST

  GMST, currently saved for logging purposes.

Private Member Functions

- RotationJ2000 & operator= (const RotationJ2000 &rhs)
- RotationJ2000 (const RotationJ2000 &rhs)

Friends

- class InputProcessor
- void init_attrjeod__RotationJ2000 ()

Additional Inherited Members

8.20.1 Detailed Description

Implements the axial rotation portion of J2000 RNP.

Definition at line 64 of file rotation_j2000.hh.

8.20.2 Constructor & Destructor Documentation

8.20.2.1 jeod::RotationJ2000::RotationJ2000 (void)

default constructor, initialize low level data

Definition at line 67 of file rotation_j2000.cc.

8.20.2.2 jeod::RotationJ2000::∼RotationJ2000 (void) [virtual]

destructor

Definition at line 80 of file rotation_j2000.cc.

8.20.2.3 jeod::RotationJ2000::RotationJ2000 (const RotationJ2000 & *rhs*) [private]

8.20.3 Member Function Documentation

8.20.3.1 RotationJ2000& jeod::RotationJ2000::operator= (const RotationJ2000 & *rhs*) [private]

8.20.3.2 void jeod::RotationJ2000::update_rotation (void) [virtual]

J2000 specific implementation of update_rotation, from PlanetRotation.

For axial rotation

Reimplemented from jeod::PlanetRotation.

Definition at line 91 of file rotation_j2000.cc.

References jeod::PlanetRotation::current_time, jeod::PlanetRotation::DEGTORAD, jeod::NutationJ2000::equa_of_equi, nutation, planet_rotational_velocity, jeod::PlanetRotation::rotation, jeod::RNPMessages::setup_error, theta_gast, and use_full_rnp.

8.20.4 Friends And Related Function Documentation

8.20.4.1 void init_attrjeod__RotationJ2000 ( ) [friend]

8.20.4.2 friend class InputProcessor [friend]

Definition at line 66 of file rotation_j2000.hh.

8.20.5 Field Documentation

8.20.5.1 double jeod::RotationJ2000::GMST

GMST, currently saved for logging purposes.

trick_units(--)

Definition at line 100 of file rotation_j2000.hh.

8.20.5.2 NutationJ2000∗ jeod::RotationJ2000::nutation

Pointer to the J2000 nutation object, used for get obliquity information out.

Will be NULL (automatically) if anything but Full_Term_RNP is set in the RNPJ2000 objecttrick_units(--)

Definition at line 80 of file rotation_j2000.hh.

Referenced by jeod::RNPJ2000::initialize(), and update_rotation().

8.20.5.3 double jeod::RotationJ2000::planet_rotational_velocity

The nominal axial rotational velocity of the earth.

trick_units(radian/s)

Definition at line 73 of file rotation_j2000.hh.

Referenced by jeod::RNPJ2000::initialize(), and update_rotation().

8.20.5.4 double jeod::RotationJ2000::theta_gast

The last theta_gast (angle the earth had axially rotated) calculated.

trick_units(radian)

Definition at line 95 of file rotation_j2000.hh.

Referenced by update_rotation().

8.20.5.5 bool jeod::RotationJ2000::use_full_rnp

Tells the rotation object if it should use a full blown rotation formulation, or just use the time passed multiplied by the rotational velocity.

Used with the different intialization options for the main RNP classtrick_units(–)

Definition at line 89 of file rotation_j2000.hh.

Referenced by jeod::RNPJ2000::initialize(), and update_rotation().

The documentation for this class was generated from the following files:

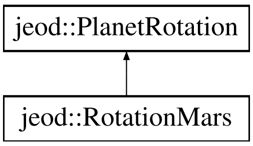
- rotation_j2000.hh
- rotation_j2000.cc

8.21 jeod::RotationMars Class Reference

Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

```
#include <rotation_mars.hh>
```

Inheritance diagram for jeod::RotationMars:



Public Member Functions

- RotationMars ()

  Default constructor, initialize low level data.
- virtual ∼RotationMars ()

  Destructor.

- virtual void update_rotation ()

  RotationMars specific implementation of update_rotation, for axial rotation.

Data Fields

- double planet_rotational_velocity

  The Mars average axial rotational velocity.
- NutationMars ∗ nutation

  Pointer to the Mars nutation object, used to access nutation in longitude information.
- bool use_full_rnp

  Tells the rotation object if it should use a full blown rotation formulation, or if it should just use the time passed multiplied by the rotational velocity.
- double phi_at_j2000

  The (constant) rotated angle of Mars at the J2000 epoch.
- double phi_spin

  The most recent calculated value of the rotation angle for Mars, measured since J2000 epoch.

Private Member Functions

- RotationMars & operator= (const RotationMars &rhs)
- RotationMars (const RotationMars &rhs)

Friends

- class InputProcessor
- void init_attrjeod__RotationMars ()

Additional Inherited Members

8.21.1 Detailed Description

Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

Definition at line 63 of file rotation_mars.hh.

8.21.2 Constructor & Destructor Documentation

8.21.2.1 jeod::RotationMars::RotationMars (void)

Default constructor, initialize low level data.

Definition at line 63 of file rotation_mars.cc.

8.21.2.2 jeod::RotationMars::∼RotationMars (void) [virtual]

Destructor.

Definition at line 78 of file rotation_mars.cc.

8.21.2.3 jeod::RotationMars::RotationMars (const **RotationMars** & *rhs*) [private]

8.21.3 Member Function Documentation

8.21.3.1 **RotationMars**& jeod::RotationMars::operator= (const **RotationMars** & *rhs*) [private]

8.21.3.2 void jeod::RotationMars::update_rotation (void) [virtual]

RotationMars specific implementation of update_rotation, for axial rotation.

Reimplemented from jeod::PlanetRotation.

Definition at line 89 of file rotation_mars.cc.

References jeod::PlanetRotation::current_time, nutation, jeod::NutationMars::nutation_in_longitude, jeod::NutationMars::obliquity_angle, phi_at_j2000, phi_spin, planet_rotational_velocity, jeod::PlanetRotation::rotation, jeod::RNPMessages::setup_error, and use_full_rnp.

8.21.4 Friends And Related Function Documentation

8.21.4.1 void init_attrjeod__RotationMars ( ) [friend]

8.21.4.2 friend class InputProcessor [friend]

Definition at line 65 of file rotation_mars.hh.

8.21.5 Field Documentation

8.21.5.1 **NutationMars**∗ jeod::RotationMars::nutation

Pointer to the Mars nutation object, used to access nutation in longitude information.

Will be NULL (automatically) if anything but Full_Term_RNP is set in the RNPMars object.trick_units(–)

Definition at line 79 of file rotation_mars.hh.

Referenced by jeod::RNPMars::initialize(), and update_rotation().

8.21.5.2 double jeod::RotationMars::phi_at_j2000

The (constant) rotated angle of Mars at the J2000 epoch.

trick_units(radian)

Definition at line 92 of file rotation_mars.hh.

Referenced by jeod::RNPMars_rnp_mars_default_data::initialize(), and update_rotation().

8.21.5.3 double jeod::RotationMars::phi_spin

The most recent calculated value of the rotation angle for Mars, measured since J2000 epoch.

trick_units(radian)

Definition at line 98 of file rotation_mars.hh.

Referenced by update_rotation().

8.21.5.4 double jeod::RotationMars::planet_rotational_velocity

The Mars average axial rotational velocity.

trick_units(radian/s)

Definition at line 72 of file rotation_mars.hh.

Referenced by jeod::RNPMars::initialize(), and update_rotation().

8.21.5.5 bool jeod::RotationMars::use_full_rnp

Tells the rotation object if it should use a full blown rotation formulation, or if it should just use the time passed multiplied by the rotational velocity.

Used with the different intialization options for the main RNP class.trick_units(–)

Definition at line 87 of file rotation_mars.hh.

Referenced by jeod::RNPMars::initialize(), and update_rotation().

The documentation for this class was generated from the following files:

- rotation_mars.hh
- rotation_mars.cc

Chapter 9

File Documentation

9.1 class_declarations.hh File Reference

Forward declarations of classes defined for JEOD 2.0 Generic RNP.

Namespaces

- jeod

  Namespace jeod.

9.1.1 Detailed Description

Forward declarations of classes defined for JEOD 2.0 Generic RNP.

Definition in file GenericRNP/include/class_declarations.hh.

9.2 class_declarations.hh File Reference

Forward declarations of classes defined for JEOD 2.0 J2000 RNP.

Namespaces

- jeod

  Namespace jeod.

9.2.1 Detailed Description

Forward declarations of classes defined for JEOD 2.0 J2000 RNP.

Definition in file RNPJ2000/include/class_declarations.hh.

9.3 data_nutation_j2000.cc File Reference

```
#include "environment/RNP/GenericRNP/include/planet_rotation_init.hh"
```

```
#include "environment/RNP/RNPJ2000/include/nutation_j2000_init.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "../include/nutation_j2000.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define JEOD_FRIEND_CLASS NutationJ2000Init_nutation_j2000_default_data

9.3.1 Macro Definition Documentation

9.3.1.1 #define JEOD_FRIEND_CLASS NutationJ2000Init_nutation_j2000_default_data

Definition at line 26 of file data_nutation_j2000.cc.

9.4 data_rnp_j2000.cc File Reference

```
#include "environment/RNP/GenericRNP/include/planet_rnp.hh"
#include "environment/RNP/RNPJ2000/include/rnp_j2000.hh"
#include "utils/named_item/include/named_item.hh"
#include "utils/ref_frames/include/ref_frame_interface.hh"
#include "../include/rnp_j2000.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define JEOD_FRIEND_CLASS RNPJ2000_rnp_j2000_default_data

9.4.1 Macro Definition Documentation

9.4.1.1 #define JEOD_FRIEND_CLASS RNPJ2000_rnp_j2000_default_data

Definition at line 27 of file data_rnp_j2000.cc.

9.5 data_rnp_mars.cc File Reference

```
#include <cmath>
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "environment/RNP/GenericRNP/include/planet_rnp.hh"
#include "environment/RNP/RNPMars/include/rnp_mars.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/named_item/include/named_item.hh"
#include "../include/rnp_mars.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define JEOD_FRIEND_CLASS RNPMars_rnp_mars_default_data

9.5.1 Macro Definition Documentation

9.5.1.1 #define JEOD_FRIEND_CLASS RNPMars_rnp_mars_default_data

Definition at line 26 of file data_rnp_mars.cc.

9.6 nutation_j2000.cc File Reference

Implementation for the NutationJ2000 class.

```
#include <cstddef>
#include <cmath>
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/nutation_j2000.hh"
#include "../include/nutation_j2000_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.6.1 Detailed Description

Implementation for the NutationJ2000 class.

Definition in file nutation_j2000.cc.

9.7 nutation_j2000.hh File Reference

Data Structures

- class jeod::NutationJ2000Init_nutation_j2000_default_data

Namespaces

- jeod

  Namespace jeod.

9.8 nutation_j2000.hh File Reference

Model the nutation portion of the RNP routine for the Standard Epoch J2000 This is form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.

```
#include "utils/sim_interface/include/jeod_class.hh"
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
```

Data Structures

- class jeod::NutationJ2000

  Implements the nutation portion of the J2000 RNP.

Namespaces

- jeod

  Namespace jeod.

9.8.1 Detailed Description

Model the nutation portion of the RNP routine for the Standard Epoch J2000 This is form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.

Definition in file include/nutation_j2000.hh.

9.9 nutation_j2000_init.cc File Reference

Implementation of NutationJ2000Init.

```
#include <cstddef>
#include "utils/memory/include/jeod_alloc.hh"
#include "../include/nutation_j2000_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.9.1 Detailed Description

Implementation of NutationJ2000Init.

Definition in file nutation_j2000_init.cc.

9.10 nutation_j2000_init.hh File Reference

Used to load data and initialize the NutationJ2000 class through NutationJ2000::initialize.

```
#include "environment/RNP/GenericRNP/include/planet_rotation_init.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::NutationJ2000Init

  The NutationJ2000Init contains coefficients and other data used to initalize a NutationJ2000 object.

Namespaces

- jeod

  Namespace jeod.

9.10.1 Detailed Description

Used to load data and initialize the NutationJ2000 class through NutationJ2000::initialize.

Definition in file nutation_j2000_init.hh.

9.11 nutation_mars.cc File Reference

Implementation for the NutationMars class.

```
#include <cstddef>
#include <cmath>
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/nutation_mars.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.11.1 Detailed Description

Implementation for the NutationMars class.

Definition in file nutation_mars.cc.

9.12 nutation_mars.hh File Reference

Represent the nutation portion of the JPL-developed "Pathfinder" Mars orientation model.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::NutationMars

  Implements the nutation portion of the "Pathfinder" Mars RNP model.

Namespaces

- jeod

  Namespace jeod.

9.12.1 Detailed Description

Represent the nutation portion of the JPL-developed "Pathfinder" Mars orientation model.

Definition in file nutation_mars.hh.

9.13 planet_orientation.cc File Reference

Implement PlanetOrientation.

```
#include <cstddef>
#include "dynamics/dyn_manager/include/dyn_manager.hh"
#include "environment/planet/include/planet.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/planet_orientation.hh"
#include "../include/RNP_messages.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.13.1 Detailed Description

Implement PlanetOrientation.

Definition in file planet_orientation.cc.

9.14 planet_orientation.hh File Reference

Establish a pure virtual framework for interfacing with the DynManager to set a planet orientation, meaning the transformation information from a planet's inertial frame to it's planet fixed frame.

```
#include <string>
#include <utility>
#include "utils/sim_interface/include/jeod_class.hh"
#include "utils/ref_frames/include/ref_frame_interface.hh"
#include "environment/ephemerides/ephem_interface/include/ephem_interface.-
hh"
#include "environment/ephemerides/ephem_item/include/ephem_orient.hh"
```

Data Structures

- class jeod::PlanetOrientation

  The generic framework for orientation models to interact with a DynManager object.

Namespaces

- jeod

  Namespace jeod.

9.14.1 Detailed Description

Establish a pure virtual framework for interfacing with the DynManager to set a planet orientation, meaning the transformation information from a planet's inertial frame to it's planet fixed frame.

Definition in file planet_orientation.hh.

9.15 planet_rnp.cc File Reference

Implement PlanetRNP.

```
#include <cstddef>
#include "dynamics/dyn_manager/include/dyn_manager.hh"
#include "environment/planet/include/planet.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/planet_rnp.hh"
#include "../include/planet_rotation.hh"
#include "../include/RNP_messages.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.15.1 Detailed Description

Implement PlanetRNP.

Definition in file planet_rnp.cc.

9.16 planet_rnp.hh File Reference

Establish a framework for rotation-nutatation-precession style planet attitude models.

```
#include "utils/sim_interface/include/jeod_class.hh"
#include "planet_orientation.hh"
```

Data Structures

- class jeod::PlanetRNP

  The generic framework for orientation models based on the RNP paradigm.

Namespaces

- jeod

  Namespace jeod.

9.16.1 Detailed Description

Establish a framework for rotation-nutatation-precession style planet attitude models.

Definition in file planet_rnp.hh.

9.17 planet_rotation.cc File Reference

Implemenation for PlanetRotation.

```
#include <cmath>
#include "utils/math/include/matrix3x3.hh"
#include "../include/planet_rotation.hh"
#include "../include/planet_rotation_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.17.1 Detailed Description

Implemenation for PlanetRotation.

Definition in file planet_rotation.cc.

9.18 planet_rotation.hh File Reference

Pure virtual polymorphic base class for all forms of planet rotation in th RNP model including precession, nutation, polar motion and axial rotation.

```
#include <math.h>
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::PlanetRotation

  The generic base class for all planet transformations.

Namespaces

- jeod

  Namespace jeod.

9.18.1 Detailed Description

Pure virtual polymorphic base class for all forms of planet rotation in th RNP model including precession, nutation, polar motion and axial rotation.

Definition in file planet_rotation.hh.

9.19 planet_rotation_init.cc File Reference

Implementation for PlanetRotationInit.

```
#include "../include/planet_rotation_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.19.1 Detailed Description

Implementation for PlanetRotationInit.

Definition in file planet_rotation_init.cc.

9.20 planet_rotation_init.hh File Reference

Pure virtual polymorphic base class meant to be used by PlanetRotation::initialize when a large amount of data that could possibly change must be used for rotation calculation.

```
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::PlanetRotationInit

  The generic base class for all initializing classes for PlanetRotation derived classes.

Namespaces

- jeod

  Namespace jeod.

9.20.1 Detailed Description

Pure virtual polymorphic base class meant to be used by PlanetRotation::initialize when a large amount of data that could possibly change must be used for rotation calculation.

Definition in file planet_rotation_init.hh.

9.21 polar_motion_j2000.cc File Reference

Implementation of PolarMotionJ2000.

```
#include <cstddef>
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/polar_motion_j2000.hh"
#include "../include/polar_motion_j2000_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.21.1 Detailed Description

Implementation of PolarMotionJ2000.

Definition in file polar_motion_j2000.cc.

9.22 polar_motion_j2000.hh File Reference

Model the polar motion portion of the RNP routine for the Standard Epoch J2000.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::PolarMotionJ2000

  Implements the polar motion portion of the J2000 RNP.

Namespaces

- jeod

  Namespace jeod.

9.22.1 Detailed Description

Model the polar motion portion of the RNP routine for the Standard Epoch J2000. This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52

Definition in file polar_motion_j2000.hh.

9.23 polar_motion_j2000_init.cc File Reference

Implementation for PolarMotionJ2000Init.

```
#include <cstddef>
#include "utils/memory/include/jeod_alloc.hh"
#include "../include/polar_motion_j2000_init.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.23.1 Detailed Description

Implementation for PolarMotionJ2000Init.

Definition in file polar_motion_j2000_init.cc.

9.24 polar_motion_j2000_init.hh File Reference

Used to load data and initialize the PolarMotionJ2000 class through PolarMotionJ2000::initialize.

```
#include "environment/RNP/GenericRNP/include/planet_rotation_init.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::PolarMotionJ2000Init

  Initializes the PolarMotionJ2000 object.

Namespaces

- jeod

  Namespace jeod.

9.24.1 Detailed Description

Used to load data and initialize the PolarMotionJ2000 class through PolarMotionJ2000::initialize.

Definition in file polar_motion_j2000_init.hh.

9.25 precession_j2000.cc File Reference

Implementation for PrecessionJ2000.

```
#include "../include/precession_j2000.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.25.1 Detailed Description

Implementation for PrecessionJ2000.

Definition in file precession_j2000.cc.

9.26 precession_j2000.hh File Reference

Model the precession for the RNP routine for the Standard Epoch J2000 This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::PrecessionJ2000

  Implements the precession portion of the J2000 RNP.

Namespaces

- jeod

  Namespace jeod.

9.26.1 Detailed Description

Model the precession for the RNP routine for the Standard Epoch J2000 This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52.

Definition in file precession_j2000.hh.

9.27 precession_mars.cc File Reference

Implementation of PrecessionMars.

```
#include <cstddef>
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/precession_mars.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.27.1 Detailed Description

Implementation of PrecessionMars.

Definition in file precession_mars.cc.

9.28 precession_mars.hh File Reference

Represent the precession portion of the JPL-developed "Pathfinder" Mars orientation model.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
#include "nutation_mars.hh"
```

Data Structures

- class jeod::PrecessionMars

  Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

Namespaces

- jeod

  Namespace jeod.

9.28.1 Detailed Description

Represent the precession portion of the JPL-developed "Pathfinder" Mars orientation model.

Definition in file precession_mars.hh.

9.29 rnp_j2000.cc File Reference

Implementation for RNPJ2000.

```
#include <cstddef>
#include "environment/time/include/time_manager.hh"
#include "environment/time/include/time_tt.hh"
#include "environment/time/include/time_ut1.hh"
#include "environment/time/include/time_gmst.hh"
#include "environment/time/include/time_dyn.hh"
#include "environment/planet/include/planet.hh"
#include "utils/math/include/matrix3x3.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "../include/rnp_j2000.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.29.1 Detailed Description

Implementation for RNPJ2000.

Definition in file rnp_j2000.cc.

9.30 rnp_j2000.hh File Reference

Data Structures

- class jeod::RNPJ2000_rnp_j2000_default_data

Namespaces

- jeod

  Namespace jeod.

9.31 rnp_j2000.hh File Reference

A specific implementation of PlanetRNP, for Earth.

```
#include "utils/sim_interface/include/jeod_class.hh"
#include "environment/RNP/GenericRNP/include/planet_rnp.hh"
#include "nutation_j2000.hh"
#include "polar_motion_j2000.hh"
#include "rotation_j2000.hh"
#include "precession_j2000.hh"
```

Data Structures

- class jeod::RNPJ2000

  Implements the J2000 RNP model using the generic RNP framework.

Namespaces

- jeod

  Namespace jeod.

9.31.1 Detailed Description

A specific implementation of PlanetRNP, for Earth. This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52

Definition in file include/rnp_j2000.hh.

9.32 rnp_mars.cc File Reference

Implementation of RNPMars.

```
#include <cstddef>
#include "environment/time/include/time_manager.hh"
#include "environment/time/include/time_tt.hh"
#include "environment/time/include/time_dyn.hh"
#include "environment/planet/include/planet.hh"
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/rnp_mars.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.32.1 Detailed Description

Implementation of RNPMars.

Definition in file rnp_mars.cc.

9.33 rnp_mars.hh File Reference

Data Structures

- class jeod::RNPMars_rnp_mars_default_data

Namespaces

- jeod

  Namespace jeod.

9.34 rnp_mars.hh File Reference

A specific implementation of PlanetRNP, for Mars.

```
#include "utils/sim_interface/include/jeod_class.hh"
#include "environment/RNP/GenericRNP/include/planet_rnp.hh"
#include "nutation_mars.hh"
#include "rotation_mars.hh"
#include "precession_mars.hh"
```

Data Structures

- class jeod::RNPMars

  Implements the "Pathfinder" Mars RNP model using the generic RNP framework.

Namespaces

- jeod

  Namespace jeod.

9.34.1 Detailed Description

A specific implementation of PlanetRNP, for Mars. This is a form of the JPL-developed "Pathfinder" Mars orientation model.

Definition in file include/rnp_mars.hh.

9.35 RNP_messages.cc File Reference

Implement RNP_messages.

```
#include "../include/RNP_messages.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define PATH "environment/RNP/"

9.35.1 Detailed Description

Implement RNP_messages.

Definition in file RNP_messages.cc.

9.36 RNP_messages.hh File Reference

Implement RNP_messages.

```
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class jeod::RNPMessages

  Describes messages used in the RNP model.

Namespaces

- jeod

  Namespace jeod.

9.36.1 Detailed Description

Implement RNP_messages.

Definition in file RNP_messages.hh.

9.37 rotation_j2000.cc File Reference

Implementation of RotationJ2000.

```
#include <cstddef>
#include <cmath>
#include "utils/message/include/message_handler.hh"
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "../include/rotation_j2000.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.37.1 Detailed Description

Implementation of RotationJ2000.

Definition in file rotation_j2000.cc.

9.38 rotation_j2000.hh File Reference

Model the axial rotation portion of the RNP routine for the Standard Epoch J2000.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
#include "nutation_j2000.hh"
```

Data Structures

- class jeod::RotationJ2000

  Implements the axial rotation portion of J2000 RNP.

Namespaces

- jeod

  Namespace jeod.

9.38.1 Detailed Description

Model the axial rotation portion of the RNP routine for the Standard Epoch J2000. This is a form of the IAU-76/FK5 RNP model, as implemented in Jeod 1.52

Definition in file rotation_j2000.hh.

9.39 rotation_mars.cc File Reference

Implementation of RotationMars.

```
#include <cstddef>
#include <cmath>
#include "environment/RNP/GenericRNP/include/RNP_messages.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/rotation_mars.hh"
```

Namespaces

- jeod

  Namespace jeod.

9.39.1 Detailed Description

Implementation of RotationMars.

Definition in file rotation_mars.cc.

9.40 rotation_mars.hh File Reference

Represent the axial rotation portion of the JPL-developed "Pathfinder" Mars orientation model.

```
#include "environment/RNP/GenericRNP/include/planet_rotation.hh"
#include "utils/sim_interface/include/jeod_class.hh"
#include "nutation_mars.hh"
```

Data Structures

- class jeod::RotationMars

  Implements the axial rotation portion of the "Pathfinder" Mars RNP model.

Namespaces

- jeod

  Namespace jeod.

9.40.1 Detailed Description

Represent the axial rotation portion of the JPL-developed "Pathfinder" Mars orientation model.

Definition in file rotation_mars.hh.

9.41 xpyp_daily.cc File Reference

```
#include "environment/RNP/GenericRNP/include/planet_rotation_init.hh"
```

```
#include "environment/RNP/RNPJ2000/include/polar_motion_j2000_init.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "../include/xpyp_daily.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define JEOD_FRIEND_CLASS PolarMotionJ2000Init_xpyp_daily_default_data

9.41.1 Macro Definition Documentation

9.41.1.1 #define JEOD_FRIEND_CLASS PolarMotionJ2000Init_xpyp_daily_default_data

Definition at line 21 of file xpyp_daily.cc.

9.42 xpyp_daily.hh File Reference

Data Structures

- class jeod::PolarMotionJ2000Init_xpyp_daily_default_data

Namespaces

- jeod

  Namespace jeod.

9.43 xpyp_monthly.cc File Reference

```
#include "environment/RNP/GenericRNP/include/planet_rotation_init.hh"
#include "environment/RNP/RNPJ2000/include/polar_motion_j2000_init.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "../include/xpyp_monthly.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define JEOD_FRIEND_CLASS PolarMotionJ2000Init_xpyp_monthly_default_data

9.43.1 Macro Definition Documentation

9.43.1.1 #define JEOD_FRIEND_CLASS PolarMotionJ2000Init_xpyp_monthly_default_data

Definition at line 21 of file xpyp_monthly.cc.

9.44 xpyp_monthly.hh File Reference

Data Structures

- class jeod::PolarMotionJ2000Init_xpyp_monthly_default_data

Namespaces

- jeod

  Namespace jeod.

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