OrbitalElementsModel

5.1

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- file orbital_elements.cc

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- file orbital_elements_messages.cc

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Namespaces

- jeod

  Namespace jeod.

Macros

- #define PATH "utils/orbital_elements/"

5.3.1 Detailed Description

5.3.2 Macro Definition Documentation

5.3.2.1 #define PATH "utils/orbital_elements/"

Definition at line 37 of file orbital_elements_messages.cc.

Chapter 6

Namespace Documentation

6.1 jeod Namespace Reference

Namespace jeod.

Data Structures

- class OrbitalElements

  Represents state in terms of Keplerian orbital elements.
- class OrbitalElementsMessages

  Specifies the message IDs used in the orbital elements model.

6.1.1 Detailed Description

Namespace jeod.

Chapter 7

Data Structure Documentation

7.1 jeod::OrbitalElements Class Reference

Represents state in terms of Keplerian orbital elements.

`#include <orbital_elements.hh>`

Public Member Functions

- OrbitalElements ()
  Construct a OrbitalElements object.
- virtual ~OrbitalElements ()
  Destroy a OrbitalElements object.
- const char * get_object_name (void) const
  Return the object name.
- const char * get_planet_name (void) const
  Return the planet name.
- void set_object_name (const char *name)
  Set the object name.
- void set_planet_name (const char *name)
  Set the planet name.
- int from_cartesian (double mu, const double pos[3], const double vel[3])
- int to_cartesian (double mu, double pos[3], double vel[3])
- int nu_to_anomalies ()
- int mean_anom_to_nu ()

Data Fields

- double semi_major_axis
  Semi-major-axis (a)
- double semiparam
  Semiparameter (p)
- double e_mag
  Magnitude of eccentricity (e)
- double inclination
  Orbit inclination (i)
- double arg_periapsis
  Argument of periapsis (w)

- double long_asc_node
  Longitude of ascending node (Omega)
- double r_mag
  Magnitude of orbital radius.
- double vel_mag
  Magnitude of orbital velocity.
- double true_anom
  True Anomaly (v)
- double mean_anom
  Mean Anomaly (M)
- double mean_motion
  Mean motion of orbit (n)
- double orbital_anom
  Eccentric (E), Hyperbolic (H), or Parabolic (B) anomaly.
- double sin_v
  Sine of the true anomaly.
- double cos_v
  Cosine of the true anomaly.
- double orb_energy
  Specific orbital energy.
- double orb_ang_momentum
  Specific orbital angular momentum.

Protected Member Functions

- int KepEqtnE (double M, double e, double ∗E)
- int KepEqtnH (double M, double e, double ∗H)
- int KepEqtnB (double M, double ∗B)

Protected Attributes

- std::string object_name
  Name of orbital object.
- std::string planet_name
  Name of planet about which the object orbits.

Private Member Functions

- OrbitalElements (const OrbitalElements &)
- OrbitalElements & operator= (const OrbitalElements &)

Friends

- class InputProcessor
- void init_attrjeod__OrbitalElements ()

7.1.1 Detailed Description

Represents state in terms of Keplerian orbital elements.

Definition at line 81 of file orbital_elements.hh.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 jeod::OrbitalElements::OrbitalElements (const OrbitalElements &) [private]

7.1.2.2 jeod::OrbitalElements::OrbitalElements (void)

Construct a OrbitalElements object.

Definition at line 61 of file orbital_elements.cc.

References arg_periapsis, cos_v, e_mag, inclination, long_asc_node, mean_anom, mean_motion, orb_ang_momentum, orb_energy, orbital_anom, r_mag, semi_major_axis, semiparam, sin_v, true_anom, and vel_mag.

7.1.2.3 jeod::OrbitalElements::~OrbitalElements (void) [virtual]

Destroy a OrbitalElements object.

Definition at line 93 of file orbital_elements.cc.

7.1.3 Member Function Documentation

7.1.3.1 int jeod::OrbitalElements::from_cartesian (double *mu,* const double *pos[3],* const double *vel[3]*)

Definition at line 184 of file orbital_elements.cc.

References arg_periapsis, e_mag, inclination, long_asc_node, mean_motion, nu_to_anomalies(), orb_ang_momentum, orb_energy, r_mag, semi_major_axis, semiparam, true_anom, and vel_mag.

7.1.3.2 const char * jeod::OrbitalElements::get_object_name (void) const

Return the object name.

Returns

Const pointer to name

Definition at line 141 of file orbital_elements.cc.

References object_name.

7.1.3.3 const char * jeod::OrbitalElements::get_planet_name (void) const

Return the planet name.

Returns

Const pointer to name

Definition at line 154 of file orbital_elements.cc.

References planet_name.

7.1.3.4 int jeod::OrbitalElements::KepEqtnB (double *M,* double * *B*) [protected]

Definition at line 904 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.5 int jeod::OrbitalElements::KepEqtnE (double *M,* double *e,* double * *E*) [protected]

Definition at line 781 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.6 int jeod::OrbitalElements::KepEqtnH (double *M,* double *e,* double * *H*) [protected]

Definition at line 837 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.7 int jeod::OrbitalElements::mean_anom_to_nu ( )

Definition at line 655 of file orbital_elements.cc.

References jeod::OrbitalElementsMessages::convergence_error, cos_v, e_mag, KepEqtnB(), KepEqtnE(), KepEqtnH(), mean_anom, orbital_anom, sin_v, and true_anom.

7.1.3.8 int jeod::OrbitalElements::nu_to_anomalies ( )

Definition at line 582 of file orbital_elements.cc.

References cos_v, e_mag, mean_anom, orbital_anom, sin_v, and true_anom.

Referenced by from_cartesian().

7.1.3.9 OrbitalElements& jeod::OrbitalElements::operator= (const OrbitalElements &) [private]

7.1.3.10 void jeod::OrbitalElements::set_object_name (const char * *name*)

Set the object name.

Parameters

in	*name*	Orbital object name

Definition at line 104 of file orbital_elements.cc.

References object_name.

7.1.3.11 void jeod::OrbitalElements::set_planet_name (const char * *name*)

Set the planet name.

Parameters

in	*name*	Name of planet about which the object orbits

Definition at line 122 of file orbital_elements.cc.

References planet_name.

7.1.3.12 int jeod::OrbitalElements::to_cartesian (double *mu,* double *pos[3],* double *vel[3]*)

Definition at line 431 of file orbital_elements.cc.

References arg_periapsis, cos_v, jeod::OrbitalElementsMessages::domain_error, e_mag, inclination, long_asc_node, semiparam, and sin_v.

7.1.4 Friends And Related Function Documentation

7.1.4.1 void init_attrjeod__OrbitalElements ( ) [friend]

7.1.4.2 friend class InputProcessor [friend]

Definition at line 83 of file orbital_elements.hh.

7.1.5 Field Documentation

7.1.5.1 double jeod::OrbitalElements::arg_periapsis

Argument of periapsis (w)

trick_units(rad)

Definition at line 108 of file orbital_elements.hh.

Referenced by from_cartesian(), OrbitalElements(), and to_cartesian().

7.1.5.2 double jeod::OrbitalElements::cos_v

Cosine of the true anomaly.

trick_units(–)

Definition at line 147 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), nu_to_anomalies(), OrbitalElements(), and to_cartesian().

7.1.5.3 double jeod::OrbitalElements::e_mag

Magnitude of eccentricity (e)

trick_units(–)

Definition at line 100 of file orbital_elements.hh.

Referenced by from_cartesian(), mean_anom_to_nu(), nu_to_anomalies(), OrbitalElements(), and to_cartesian().

7.1.5.4 double jeod::OrbitalElements::inclination

Orbit inclination (i)

trick_units(rad)

Definition at line 104 of file orbital_elements.hh.

Referenced by from_cartesian(), OrbitalElements(), and to_cartesian().

7.1.5.5 double jeod::OrbitalElements::long_asc_node

Longitude of ascending node (Omega)

trick_units(rad)

Definition at line 112 of file orbital_elements.hh.

Referenced by from_cartesian(), OrbitalElements(), and to_cartesian().

7.1.5.6 double jeod::OrbitalElements::mean_anom

Mean Anomaly (M)

trick_units(rad)

Definition at line 130 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), nu_to_anomalies(), and OrbitalElements().

7.1.5.7 double jeod::OrbitalElements::mean_motion

Mean motion of orbit (n)

trick_units(rad/s)

Definition at line 134 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

7.1.5.8 std::string jeod::OrbitalElements::object_name [protected]

Name of orbital object.

trick_units(–)

Definition at line 161 of file orbital_elements.hh.

Referenced by get_object_name(), and set_object_name().

7.1.5.9 double jeod::OrbitalElements::orb_ang_momentum

Specific orbital angular momentum.

trick_units(m2/s)

Definition at line 155 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

7.1.5.10 double jeod::OrbitalElements::orb_energy

Specific orbital energy.

trick_units(m2/s2)

Definition at line 151 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

7.1.5.11 double jeod::OrbitalElements::orbital_anom

Eccentric (E), Hyperbolic (H), or Parabolic (B) anomaly.

trick_units(rad)

Definition at line 138 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), nu_to_anomalies(), and OrbitalElements().

7.1.5.12 std::string jeod::OrbitalElements::planet_name [protected]

Name of planet about which the object orbits.

trick_units(–)

Definition at line 165 of file orbital_elements.hh.

Referenced by get_planet_name(), and set_planet_name().

7.1.5.13 double jeod::OrbitalElements::r_mag

Magnitude of orbital radius.

trick_units(m)

Definition at line 118 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

7.1.5.14 double jeod::OrbitalElements::semi_major_axis

Semi-major-axis (a)

trick_units(m)

Definition at line 92 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

7.1.5.15 double jeod::OrbitalElements::semiparam

Semiparameter (p)

trick_units(m)

Definition at line 96 of file orbital_elements.hh.

Referenced by from_cartesian(), OrbitalElements(), and to_cartesian().

7.1.5.16 double jeod::OrbitalElements::sin_v

Sine of the true anomaly.

trick_units(–)

Definition at line 143 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), nu_to_anomalies(), OrbitalElements(), and to_cartesian().

7.1.5.17 double jeod::OrbitalElements::true_anom

True Anomaly (v)

trick_units(rad)

Definition at line 126 of file orbital_elements.hh.

Referenced by from_cartesian(), mean_anom_to_nu(), nu_to_anomalies(), and OrbitalElements().

7.1.5.18 double jeod::OrbitalElements::vel_mag

Magnitude of orbital velocity.

trick_units(m/s)

Definition at line 122 of file orbital_elements.hh.

Referenced by from_cartesian(), and OrbitalElements().

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

- orbital_elements.hh
- orbital_elements.cc

7.2 jeod::OrbitalElementsMessages Class Reference

Specifies the message IDs used in the orbital elements model.

`#include <orbital_elements_messages.hh>`

Static Public Attributes

- static char const * domain_error

  Issued when a value / set of values is invalid.
- static char const * convergence_error

  Issued when a numeric search fails to converge.

Private Member Functions

- OrbitalElementsMessages (void)
- OrbitalElementsMessages (const OrbitalElementsMessages &)
- OrbitalElementsMessages & operator= (const OrbitalElementsMessages &)

Friends

- class InputProcessor
- void init_attrjeod__OrbitalElementsMessages ()

7.2.1 Detailed Description

Specifies the message IDs used in the orbital elements model.

Definition at line 83 of file orbital_elements_messages.hh.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 jeod::OrbitalElementsMessages::OrbitalElementsMessages (void) [private]

7.2.2.2 jeod::OrbitalElementsMessages::OrbitalElementsMessages (const OrbitalElementsMessages &) [private]

7.2.3 Member Function Documentation

7.2.3.1 OrbitalElementsMessages& jeod::OrbitalElementsMessages::operator= (const OrbitalElementsMessages &) [private]

7.2.4 Friends And Related Function Documentation

7.2.4.1 void init_attrjeod__OrbitalElementsMessages ( ) [friend]

7.2.4.2 friend class InputProcessor [friend]

Definition at line 86 of file orbital_elements_messages.hh.

7.2.5 Field Documentation

7.2.5.1 char const * jeod::OrbitalElementsMessages::convergence_error [static]

Initial value:

```
=
    "utils/orbital_elements/"  "convergence_error"
```

Issued when a numeric search fails to converge.

trick_units(–)

Definition at line 100 of file orbital_elements_messages.hh.

Referenced by jeod::OrbitalElements::mean_anom_to_nu().

7.2.5.2 char const * jeod::OrbitalElementsMessages::domain_error [static]

Initial value:

```
=
    "utils/orbital_elements/"  "domain_error"
```

Issued when a value / set of values is invalid.

trick_units(–)

Definition at line 95 of file orbital_elements_messages.hh.

Referenced by jeod::OrbitalElements::to_cartesian().

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

- orbital_elements_messages.hh
- orbital_elements_messages.cc

Chapter 8

File Documentation

8.1 orbital_elements.cc File Reference

Define methods for the OrbitalElements class.

```
#include <cmath>
#include <cstddef>
#include "utils/math/include/vector3.hh"
#include "utils/memory/include/jeod_alloc.hh"
#include "utils/message/include/message_handler.hh"
#include "../include/orbital_elements.hh"
#include "../include/orbital_elements_messages.hh"
```

Namespaces

- jeod

  Namespace jeod.

8.1.1 Detailed Description

Define methods for the OrbitalElements class.

Definition in file orbital_elements.cc.

8.2 orbital_elements.hh File Reference

Orbital elements class definition.

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

Data Structures

- class jeod::OrbitalElements

  Represents state in terms of Keplerian orbital elements.

Namespaces

- jeod

  Namespace jeod.

8.2.1 Detailed Description

Orbital elements class definition.

Definition in file orbital_elements.hh.

8.3 orbital_elements_messages.cc File Reference

Implement the class OrbitalElementsMessages.

```
#include "../include/orbital_elements_messages.hh"
```

Namespaces

- jeod

  Namespace jeod.

Macros

- #define PATH "utils/orbital_elements/"

8.3.1 Detailed Description

Implement the class OrbitalElementsMessages.

Definition in file orbital_elements_messages.cc.

8.4 orbital_elements_messages.hh File Reference

Define the class OrbitalElementsMessages, the class that specifies the message IDs used in the orbital elements model.

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

Data Structures

- class jeod::OrbitalElementsMessages

  Specifies the message IDs used in the orbital elements model.

Namespaces

- jeod

  Namespace jeod.

8.4.1 Detailed Description

Define the class OrbitalElementsMessages, the class that specifies the message IDs used in the orbital elements model.

Definition in file orbital_elements_messages.hh.

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