

OrbitalElementsModel

5.3

Generated by Doxygen 1.8.14

Contents

1	Module Index	1
1.1	Modules	1
2	Namespace Index	3
2.1	Namespace List	3
3	Data Structure Index	5
3.1	Data Structures	5
4	File Index	7
4.1	File List	7
5	Module Documentation	9
5.1	Models	9
5.1.1	Detailed Description	9
5.2	Utils	10
5.2.1	Detailed Description	10
5.3	OrbitalElements	11
5.3.1	Detailed Description	11
6	Namespace Documentation	13
6.1	jeod Namespace Reference	13
6.1.1	Detailed Description	13

7 Data Structure Documentation	15
7.1 jeod::OrbitalElements Class Reference	15
7.1.1 Detailed Description	16
7.1.2 Constructor & Destructor Documentation	17
7.1.2.1 OrbitalElements() [1/2]	17
7.1.2.2 ~OrbitalElements()	17
7.1.2.3 OrbitalElements() [2/2]	17
7.1.3 Member Function Documentation	17
7.1.3.1 from_cartesian()	17
7.1.3.2 get_object_name()	17
7.1.3.3 get_planet_name()	18
7.1.3.4 KepEqtnB()	18
7.1.3.5 KepEqtnE()	18
7.1.3.6 KepEqtnH()	18
7.1.3.7 mean_anom_to_nu()	19
7.1.3.8 nu_to_anomalies()	19
7.1.3.9 operator=()	19
7.1.3.10 set_object_name()	19
7.1.3.11 set_planet_name()	20
7.1.3.12 to_cartesian()	20
7.1.4 Friends And Related Function Documentation	20
7.1.4.1 init_attrjeod__OrbitalElements	20
7.1.4.2 InputProcessor	20
7.1.5 Field Documentation	20
7.1.5.1 arg_periapsis	21
7.1.5.2 cos_v	21
7.1.5.3 e_mag	21
7.1.5.4 inclination	21
7.1.5.5 long_asc_node	22
7.1.5.6 mean_anom	22

7.1.5.7	mean_motion	22
7.1.5.8	object_name	22
7.1.5.9	orb_ang_momentum	23
7.1.5.10	orb_energy	23
7.1.5.11	orbital_anom	23
7.1.5.12	planet_name	23
7.1.5.13	r_mag	24
7.1.5.14	semi_major_axis	24
7.1.5.15	semiparam	24
7.1.5.16	sin_v	24
7.1.5.17	true_anom	25
7.1.5.18	vel_mag	25
7.2	jeod::OrbitalElementsMessages Class Reference	25
7.2.1	Detailed Description	26
7.2.2	Constructor & Destructor Documentation	26
7.2.2.1	OrbitalElementsMessages() [1/2]	26
7.2.2.2	OrbitalElementsMessages() [2/2]	26
7.2.3	Member Function Documentation	26
7.2.3.1	operator=()	26
7.2.4	Friends And Related Function Documentation	26
7.2.4.1	init_attrjeod__OrbitalElementsMessages	26
7.2.4.2	InputProcessor	27
7.2.5	Field Documentation	27
7.2.5.1	convergence_error	27
7.2.5.2	domain_error	27
8	File Documentation	29
8.1	orbital_elements.cc File Reference	29
8.1.1	Detailed Description	29
8.2	orbital_elements.hh File Reference	29
8.2.1	Detailed Description	30
8.3	orbital_elements_messages.cc File Reference	30
8.3.1	Detailed Description	30
8.3.2	Macro Definition Documentation	30
8.3.2.1	MAKE_ORBITALELEMENTS_MESSAGE_CODE	31
8.4	orbital_elements_messages.hh File Reference	31
8.4.1	Detailed Description	31
	Index	33

Chapter 1

Module Index

1.1 Modules

Here is a list of all modules:

Models	9
Utils	10
OrbitalElements	11

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all namespaces with brief descriptions:

jeod	Namespace jeod	13
----------------------	--------------------------	--------------------

Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

jeod::OrbitalElements	
Represents state in terms of Keplerian orbital elements	15
jeod::OrbitalElementsMessages	
Specifies the message IDs used in the orbital elements model	25

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

orbital_elements.cc	Define methods for the OrbitalElements class	29
orbital_elements.hh	Orbital elements class definition	29
orbital_elements_messages.cc	Implement the class OrbitalElementsMessages	30
orbital_elements_messages.hh	Define the class OrbitalElementsMessages, the class that specifies the message IDs used in the orbital elements model	31

Chapter 5

Module Documentation

5.1 Models

Modules

- [Utils](#)

5.1.1 Detailed Description

5.2 Utils

Modules

- [OrbitalElements](#)

5.2.1 Detailed Description

5.3 OrbitalElements

Files

- file [orbital_elements.hh](#)
Orbital elements class definition.
- file [orbital_elements_messages.hh](#)
Define the class OrbitalElementsMessages, the class that specifies the message IDs used in the orbital elements model.
- file [orbital_elements.cc](#)
Define methods for the OrbitalElements class.
- file [orbital_elements_messages.cc](#)
Implement the class OrbitalElementsMessages.

Namespaces

- [jeod](#)
Namespace jeod.

5.3.1 Detailed Description

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](#) ()=default
- virtual [~OrbitalElements](#) ()=default
- [OrbitalElements](#) (const [OrbitalElements](#) &)=delete
- [OrbitalElements](#) & [operator=](#) (const [OrbitalElements](#) &)=delete
- const std::string & [get_object_name](#) () const
Return the object name.
- const std::string & [get_planet_name](#) () const
Return the planet name.
- void [set_object_name](#) (const std::string &name)
Set the object name.
- void [set_planet_name](#) (const std::string &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](#) {1.0}
- *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.*

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 OrbitalElements() [1/2]

```
jeod::OrbitalElements::OrbitalElements ( ) [default]
```

7.1.2.2 ~OrbitalElements()

```
virtual jeod::OrbitalElements::~~OrbitalElements ( ) [virtual], [default]
```

7.1.2.3 OrbitalElements() [2/2]

```
jeod::OrbitalElements::OrbitalElements (
    const OrbitalElements & ) [delete]
```

7.1.3 Member Function Documentation

7.1.3.1 from_cartesian()

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

Definition at line 120 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 get_object_name()

```
const std::string & jeod::OrbitalElements::get_object_name ( ) const
```

Return the object name.

Returns

Const pointer to name

Definition at line 85 of file orbital_elements.cc.

References [object_name](#).

7.1.3.3 get_planet_name()

```
const std::string & jeod::OrbitalElements::get_planet_name ( ) const
```

Return the planet name.

Returns

Const pointer to name

Definition at line 94 of file orbital_elements.cc.

References planet_name.

7.1.3.4 KepEqtnB()

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

Definition at line 874 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.5 KepEqtnE()

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

Definition at line 747 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.6 KepEqtnH()

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

Definition at line 802 of file orbital_elements.cc.

Referenced by mean_anom_to_nu().

7.1.3.7 mean_anom_to_nu()

```
int jeod::OrbitalElements::mean_anom_to_nu ( )
```

Definition at line 616 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 nu_to_anomalies()

```
int jeod::OrbitalElements::nu_to_anomalies ( )
```

Definition at line 543 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 operator=()

```
OrbitalElements& jeod::OrbitalElements::operator= (
    const OrbitalElements & ) [delete]
```

7.1.3.10 set_object_name()

```
void jeod::OrbitalElements::set_object_name (
    const std::string & name )
```

Set the object name.

Parameters

in	<i>name</i>	Orbital object name
----	-------------	---------------------

Definition at line 59 of file orbital_elements.cc.

References `object_name`.

7.1.3.11 set_planet_name()

```
void jeod::OrbitalElements::set_planet_name (
    const std::string & name )
```

Set the planet name.

Parameters

in	<i>name</i>	Name of planet about which the object orbits
----	-------------	--

Definition at line 72 of file orbital_elements.cc.

References planet_name.

7.1.3.12 to_cartesian()

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

Definition at line 382 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 init_attrjeod__OrbitalElements

```
void init_attrjeod__OrbitalElements ( ) [friend]
```

7.1.4.2 InputProcessor

```
friend class InputProcessor [friend]
```

Definition at line 83 of file orbital_elements.hh.

7.1.5 Field Documentation

7.1.5.1 arg_periapsis

```
double jeod::OrbitalElements::arg_periapsis {}
```

Argument of periapsis (w)

trick_units(rad)

Definition at line 105 of file orbital_elements.hh.

Referenced by from_cartesian(), and to_cartesian().

7.1.5.2 cos_v

```
double jeod::OrbitalElements::cos_v {1.0}
```

Cosine of the true anomaly.

trick_units(-)

Definition at line 144 of file orbital_elements.hh.

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

7.1.5.3 e_mag

```
double jeod::OrbitalElements::e_mag {}
```

Magnitude of eccentricity (e)

trick_units(-)

Definition at line 97 of file orbital_elements.hh.

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

7.1.5.4 inclination

```
double jeod::OrbitalElements::inclination {}
```

Orbit inclination (i)

trick_units(rad)

Definition at line 101 of file orbital_elements.hh.

Referenced by from_cartesian(), and to_cartesian().

7.1.5.5 long_asc_node

```
double jeod::OrbitalElements::long_asc_node {}
```

Longitude of ascending node (Omega)

trick_units(rad)

Definition at line 109 of file orbital_elements.hh.

Referenced by from_cartesian(), and to_cartesian().

7.1.5.6 mean_anom

```
double jeod::OrbitalElements::mean_anom {}
```

Mean Anomaly (M)

trick_units(rad)

Definition at line 127 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), and nu_to_anomalies().

7.1.5.7 mean_motion

```
double jeod::OrbitalElements::mean_motion {}
```

Mean motion of orbit (n)

trick_units(rad/s)

Definition at line 131 of file orbital_elements.hh.

Referenced by from_cartesian().

7.1.5.8 object_name

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

Name of orbital object.

trick_units(-)

Definition at line 158 of file orbital_elements.hh.

Referenced by get_object_name(), and set_object_name().

7.1.5.9 orb_ang_momentum

```
double jeod::OrbitalElements::orb_ang_momentum {}
```

Specific orbital angular momentum.

trick_units(m2/s)

Definition at line 152 of file orbital_elements.hh.

Referenced by from_cartesian().

7.1.5.10 orb_energy

```
double jeod::OrbitalElements::orb_energy {}
```

Specific orbital energy.

trick_units(m2/s2)

Definition at line 148 of file orbital_elements.hh.

Referenced by from_cartesian().

7.1.5.11 orbital_anom

```
double jeod::OrbitalElements::orbital_anom {}
```

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

trick_units(rad)

Definition at line 135 of file orbital_elements.hh.

Referenced by mean_anom_to_nu(), and nu_to_anomalies().

7.1.5.12 planet_name

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

Name of planet about which the object orbits.

trick_units(-)

Definition at line 162 of file orbital_elements.hh.

Referenced by get_planet_name(), and set_planet_name().

7.1.5.13 r_mag

```
double jeod::OrbitalElements::r_mag {}
```

Magnitude of orbital radius.

trick_units(m)

Definition at line 115 of file orbital_elements.hh.

Referenced by from_cartesian().

7.1.5.14 semi_major_axis

```
double jeod::OrbitalElements::semi_major_axis {}
```

Semi-major-axis (a)

trick_units(m)

Definition at line 89 of file orbital_elements.hh.

Referenced by from_cartesian().

7.1.5.15 semiparam

```
double jeod::OrbitalElements::semiparam {}
```

Semiparameter (p)

trick_units(m)

Definition at line 93 of file orbital_elements.hh.

Referenced by from_cartesian(), and to_cartesian().

7.1.5.16 sin_v

```
double jeod::OrbitalElements::sin_v {}
```

Sine of the true anomaly.

trick_units(-)

Definition at line 140 of file orbital_elements.hh.

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

7.1.5.17 true_anom

```
double jeod::OrbitalElements::true_anom {}
```

True Anomaly (v)

trick_units(rad)

Definition at line 123 of file orbital_elements.hh.

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

7.1.5.18 vel_mag

```
double jeod::OrbitalElements::vel_mag {}
```

Magnitude of orbital velocity.

trick_units(m/s)

Definition at line 119 of file orbital_elements.hh.

Referenced by from_cartesian().

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>
```

Public Member Functions

- [OrbitalElementsMessages](#) ()=delete
- [OrbitalElementsMessages](#) (const [OrbitalElementsMessages](#) &)=delete
- [OrbitalElementsMessages](#) & operator= (const [OrbitalElementsMessages](#) &)=delete

Static Public Attributes

- static const char * [domain_error](#) = "utils/orbital_elements/" "domain_error"
Issued when a value / set of values is invalid.
- static const char * [convergence_error](#) = "utils/orbital_elements/" "convergence_error"
Issued when a numeric search fails to converge.

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 81 of file orbital_elements_messages.hh.

7.2.2 Constructor & Destructor Documentation

7.2.2.1 [OrbitalElementsMessages](#)() [1/2]

```
jeod::OrbitalElementsMessages::OrbitalElementsMessages ( ) [delete]
```

7.2.2.2 [OrbitalElementsMessages](#)() [2/2]

```
jeod::OrbitalElementsMessages::OrbitalElementsMessages (
    const OrbitalElementsMessages & ) [delete]
```

7.2.3 Member Function Documentation

7.2.3.1 [operator=\(\)](#)

```
OrbitalElementsMessages& jeod::OrbitalElementsMessages::operator= (
    const OrbitalElementsMessages & ) [delete]
```

7.2.4 Friends And Related Function Documentation

7.2.4.1 [init_attrjeod__OrbitalElementsMessages](#)

```
void init_attrjeod__OrbitalElementsMessages ( ) [friend]
```


7.2.4.2 InputProcessor

```
friend class InputProcessor [friend]
```

Definition at line 83 of file orbital_elements_messages.hh.

7.2.5 Field Documentation

7.2.5.1 convergence_error

```
char const * jeod::OrbitalElementsMessages::convergence_error = "utils/orbital_elements/"  
"convergence_error" [static]
```

Issued when a numeric search fails to converge.

trick_units(-)

Definition at line 93 of file orbital_elements_messages.hh.

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

7.2.5.2 domain_error

```
char const * jeod::OrbitalElementsMessages::domain_error = "utils/orbital_elements/" "domain_↵  
error" [static]
```

Issued when a value / set of values is invalid.

trick_units(-)

Definition at line 88 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 <cstdlib>
#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.

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.

8.3 orbital_elements_messages.cc File Reference

Implement the class OrbitalElementsMessages.

```
#include "utils/message/include/make_message_code.hh"  
#include "../include/orbital_elements_messages.hh"
```

Namespaces

- [jeod](#)
Namespace jeod.

Macros

- #define [MAKE_ORBITALELEMENTS_MESSAGE_CODE](#)(id) JEOD_MAKE_MESSAGE_CODE(OrbitalElementsMessages, "utils/orbital_elements/", id)

8.3.1 Detailed Description

Implement the class OrbitalElementsMessages.

8.3.2 Macro Definition Documentation

8.3.2.1 MAKE_ORBITALELEMENTS_MESSAGE_CODE

```
#define MAKE_ORBITALELEMENTS_MESSAGE_CODE(  
    id ) JEOD_MAKE_MESSAGE_CODE(OrbitalElementsMessages, "utils/orbital_elements/",  
    id)
```

Definition at line 43 of 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.

Index

`~OrbitalElements`
 `jeod::OrbitalElements`, [17](#)

`arg_periapsis`
 `jeod::OrbitalElements`, [20](#)

`convergence_error`
 `jeod::OrbitalElementsMessages`, [27](#)

`cos_v`
 `jeod::OrbitalElements`, [21](#)

`domain_error`
 `jeod::OrbitalElementsMessages`, [27](#)

`e_mag`
 `jeod::OrbitalElements`, [21](#)

`from_cartesian`
 `jeod::OrbitalElements`, [17](#)

`get_object_name`
 `jeod::OrbitalElements`, [17](#)

`get_planet_name`
 `jeod::OrbitalElements`, [17](#)

`inclination`
 `jeod::OrbitalElements`, [21](#)

`init_attrjeod__OrbitalElements`
 `jeod::OrbitalElements`, [20](#)

`init_attrjeod__OrbitalElementsMessages`
 `jeod::OrbitalElementsMessages`, [26](#)

`InputProcessor`
 `jeod::OrbitalElements`, [20](#)
 `jeod::OrbitalElementsMessages`, [26](#)

`jeod`, [13](#)

`jeod::OrbitalElements`, [15](#)
 `~OrbitalElements`, [17](#)
 `arg_periapsis`, [20](#)
 `cos_v`, [21](#)
 `e_mag`, [21](#)
 `from_cartesian`, [17](#)
 `get_object_name`, [17](#)
 `get_planet_name`, [17](#)
 `inclination`, [21](#)
 `init_attrjeod__OrbitalElements`, [20](#)
 `InputProcessor`, [20](#)
 `KepEqtnB`, [18](#)
 `KepEqtnE`, [18](#)
 `KepEqtnH`, [18](#)
 `long_asc_node`, [21](#)

`mean_anom`, [22](#)
 `mean_anom_to_nu`, [18](#)
 `mean_motion`, [22](#)
 `nu_to_anomalies`, [19](#)
 `object_name`, [22](#)
 `operator=`, [19](#)
 `orb_ang_momentum`, [22](#)
 `orb_energy`, [23](#)
 `orbital_anom`, [23](#)
 `OrbitalElements`, [17](#)
 `planet_name`, [23](#)
 `r_mag`, [23](#)
 `semi_major_axis`, [24](#)
 `semiparam`, [24](#)
 `set_object_name`, [19](#)
 `set_planet_name`, [19](#)
 `sin_v`, [24](#)
 `to_cartesian`, [20](#)
 `true_anom`, [24](#)
 `vel_mag`, [25](#)

`jeod::OrbitalElementsMessages`, [25](#)
 `convergence_error`, [27](#)
 `domain_error`, [27](#)
 `init_attrjeod__OrbitalElementsMessages`, [26](#)
 `InputProcessor`, [26](#)
 `operator=`, [26](#)
 `OrbitalElementsMessages`, [26](#)

`KepEqtnB`
 `jeod::OrbitalElements`, [18](#)

`KepEqtnE`
 `jeod::OrbitalElements`, [18](#)

`KepEqtnH`
 `jeod::OrbitalElements`, [18](#)

`long_asc_node`
 `jeod::OrbitalElements`, [21](#)

`MAKE_ORBITALELEMENTS_MESSAGE_CODE`
 `orbital_elements_messages.cc`, [30](#)

`mean_anom`
 `jeod::OrbitalElements`, [22](#)

`mean_anom_to_nu`
 `jeod::OrbitalElements`, [18](#)

`mean_motion`
 `jeod::OrbitalElements`, [22](#)

`Models`, [9](#)

`nu_to_anomalies`
 `jeod::OrbitalElements`, [19](#)

- object_name
 - jeod::OrbitalElements, [22](#)
- operator=
 - jeod::OrbitalElements, [19](#)
 - jeod::OrbitalElementsMessages, [26](#)
- orb_ang_momentum
 - jeod::OrbitalElements, [22](#)
- orb_energy
 - jeod::OrbitalElements, [23](#)
- orbital_anom
 - jeod::OrbitalElements, [23](#)
- orbital_elements.cc, [29](#)
- orbital_elements.hh, [29](#)
- orbital_elements_messages.cc, [30](#)
 - MAKE_ORBITALELEMENTS_MESSAGE_CODE,
[30](#)
- orbital_elements_messages.hh, [31](#)
- OrbitalElements, [11](#)
 - jeod::OrbitalElements, [17](#)
- OrbitalElementsMessages
 - jeod::OrbitalElementsMessages, [26](#)
- planet_name
 - jeod::OrbitalElements, [23](#)
- r_mag
 - jeod::OrbitalElements, [23](#)
- semi_major_axis
 - jeod::OrbitalElements, [24](#)
- semiparam
 - jeod::OrbitalElements, [24](#)
- set_object_name
 - jeod::OrbitalElements, [19](#)
- set_planet_name
 - jeod::OrbitalElements, [19](#)
- sin_v
 - jeod::OrbitalElements, [24](#)
- to_cartesian
 - jeod::OrbitalElements, [20](#)
- true_anom
 - jeod::OrbitalElements, [24](#)
- Utils, [10](#)
- vel_mag
 - jeod::OrbitalElements, [25](#)