User Manual 3.3 Slew

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Sommaire

Introduction

Scope

A slew performs the transition between two attitude laws.

Javadoc

The attitude objects linked to slews are available in the package org.orekit.attitudes in the Orekit add-ons library.

Library	Javadoc
Orekit addons	Package org.orekit.attitudes

Links

None as of now.

Useful Documents

None as of now.

Package Overview

The slew conception is described hereafter :

Fichier:Slewdiagram2.png

Legend :

- green : new objects
- grey : modified existing objects
- blue : existing objects

A slew is represented by the abstract class `AbstractSlew`, which implements the interface `Slew`. An slew describes how the spacecraft joins up two successive attitude laws: the classes heriting from `AbstractSlew` (like the class `ConstantSpinSlew`) contain the algorithms to compute the maneuver.

A slew is bounded in time and as a result inherits the AttitudeLeg interface.

Features

Constant spin slew

The constant spin slew is a basic slew maneuver type. Between the initial quaternion and the final one, a spherical linear interpolation ([MAT_QRO_Rotations slerp interpolation]) describes the behavior of the spacecraft. In order to properly compute the slew, the user must specify the initial and final quaternion, plus a computation constraint:

- Minimal duration:
  - the initial and final date of the slew maneuver are given:
    final Slew slew = new ConstantSpinSlew(firstLaw, secondLaw, startDate, endDate);
  - the initial date of the slew maneuver and its duration are given:
    final Slew slew = new ConstantSpinSlew(firstLaw, secondLaw, startDate, true, 150., Constraint.DURATION);
  - the final date of the slew maneuver and its duration are given:
    final Slew slew = new ConstantSpinSlew(firstLaw, secondLaw, endDate, false, 150., Constraint.DURATION);
- Maximal angular velocity:
  - the initial (or final) date of the slew maneuver and the maximal angular velocity are given:
    final Slew slew = new ConstantSpinSlew(firstLaw, secondLaw, startDate, true, 0.2, Constraint.ANGULAR_VELOCITY);

Once the slew maneuver defined, the computation can be performed on an orbital state using the following method:

```
slew.compute(orbit);
```

Spin bias slew

The two spin bias slew is a slew maneuver type. The velocity depends on the value of the slew angle.

In order to compute properly the slew, the user must specify the initial and final laws, the parameters of the two angular velocity fields, plus the stabilisation margin:

```
final TwoSpinBiasSlew slew = new TwoSpinBiasSlew(startLaw, finalLaw,
initialDate,
    step, theta_max, tau, epsInRall, omega2, theta, epsOutRall, omega1,
dtStab);
```

Once the slew maneuver is defined, the computation can be performed on an orbital state using the following method:

```
slew.compute(orbit);
```

It is possible to get the attitude ephemeris representing the slew using the following method:

```
final TabulatedAttitude ephem = slew.getEphemeris();
```

Getting Started

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Interfaces

Interface	Summary	Javadoc
AttitudeLeg	This interface extends the AttitudeProvider interface and adds the time interval of validity notion to the attitude laws.	AttitudeLeg
Slew	This interface implements a generic slew model set.	Slew

Classes

Class	Summary	Javadoc
AbstractSlew	This abstract class implements slew maneuvers.	AbstractSlew
ConstantSpinSlew	This class implements the constant spin slew maneuver profile.	ConstantSpinSlew
TwoSpinBiasSlew	This class implements the spin bias slew profile with two available spin profiles.	TwoSpinBiasSlew
IsisAnalyticalSpinBiasSlew	This class implements the ISIS spin bias slew profile (constant acceleration/decceleration phases - Analytical solution).	IsisAnalyticalSpinBiasSlew

IsisNumericalSpinBiasSlew	This class implements the ISIS spin bias slew profile (constant acceleration/decceleration phases - Numerical solution).	IsisNumericalSpinBiasSlew

Tutorials

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