

GPAAttitudeSequence

De Wiki

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[GPAAttitudeSequence](#)

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How to call it

For using the [GPAAttitudeSequence](#) class the developer has only to create such an object with these two possibilities:

- With just two **boolean** to tell if the switches and the law list will be displayed one below the other (**false**) one or just one by one (**true**)

```
attSeq = new GPAAttitudeSequence(false, true);
```

- Or with an additional parameter that corresponds to an absolute date which will be used as a reference date (for relative positioning of attitude laws).

```
AbsoluteDate date0 =  
    new AbsoluteDate(2010, 1, 1, TimeScalesFactory.getUTC());  
attSeq = new GPAAttitudeSequence(date0, false, false);
```

Display

Reference date

First, the user will have to select a reference date. There are two possibilities:

- “**custom**”: a specific date will be entered by the user
- “**external**”: in that case no modification of the date is available as it corresponds to the date initially defined (note that this date may be automatically updated if the initial orbit date is modified).

Reference Date:

Date mode: ☐ custom ☒ external

External date: [UTC](#)

List of attitude laws

Then, a button appears that allows displaying a new window to define a set of available attitude laws. Each law is defined as below:

- Name of the law
- Type of the law (local orbital frame (**LOF**), inertial, sun pointing ...)
- Law evolution (constant or spinned)
- Then data linked to the type of law. As an example for **LOF** attitude law, the user will have to select which **LOF** to take into account and eventually angle bias.

The screenshot shows a window titled "Attitude Laws List" with a close button (X) in the top right corner. Inside the window, there are controls for managing a list of laws:

- Amount of laws ***: A text input field containing the value "3".
- Number of the law**: A set of controls including a left arrow button, a text input field containing "1", a right arrow button, and a link labeled "Items +/-".
- Law1**: A section for configuring the first law, containing:
 - Attitude Law: ***: A label.
 - Law name: ***: A text input field containing "LawName1".
 - Law type:**: A dropdown menu currently showing "LOF".
 - Law evolution:**: A dropdown menu currently showing "Constant".
 - LOF Att. Law: ***: A label.
 - Local Orbital Frame:**: A dropdown menu currently showing "LVLH".
 - ☐ **Display expert config**: An unchecked checkbox.
 - Angles bias ***: A checked checkbox.
 - Rotation: ***: A button labeled "Pivot".
 - ☐ **Deactivate conversions**: An unchecked checkbox.
 - Order: ***: A dropdown menu currently showing "ZYX Cardan angles".
 - Psi:**: A text input field containing "0.0" followed by a blue "deg" link.
 - Theta: ***: A text input field containing "180.0" followed by a blue "deg" link.
 - Phi:**: A text input field containing "0.0" followed by a blue "deg" link.

Sequence

At last, the user will get a choice between:

- A simple attitude sequence with only a single law chosen in the previous list (available since V1.3)

version)

Attitude Laws:

[Set attitude laws...](#)

Mode: * ☐ Switch ☒ Simple

Simple Law: * [LawName1](#) ▼

- A more sophisticated definition of the attitude sequence using the PATRIUS “event switch” possibility. The user will have to define one or several switches defined by the following data:
 - The attitude law before the event (taken in the previous list)
 - The attitude law once the event occurred (taken in the previous list)
 - The type of event and data related to it.

This “event switch” is a very powerful option that allows defining relatively shortly a whole mission. For example, if we want to define the fact that the vehicle is **LVLH** oriented in eclipse and Sun pointing out of eclipse, we will only have to define two switches calling to two attitude laws:

- Switch #1 with entering in eclipse as orbital event and law before "Sun pointing" and law after "**LVLH**"
- Switch #2 with exiting in eclipse as orbital event and law before "**LVLH**" and law after "Sun pointing"

Attitude Laws:

[Set attitude laws...](#)

Switches:

Amount of switches

Number of the switch [Items +/-](#)

Switch1

Law before [LawName1](#) ▼

Law after [LawName2](#) ▼

Type of Event [ECLIPSE](#) ▼

☒ Display event config

Eclipse Detector

Event type: ☒ Entering eclipse
☐ Exiting eclipse
☐ Entering/Exiting eclipse

Start at occurrence:

Action: [RESET_STATE](#) ▼

☐ Display expert config

How to use it

To get a [[PATRIUS](#)] [AttitudeSequence](#) object, we will just have to call for the [getPatriusObject\(\)](#) method as below:

```
AttitudesSequence seq = attSeq.getPatriusObject();
```

How it is stored

Here is the [XML](#) format for a sequence:

```
<String name="dateMode">external</String>
<AbsoluteDate name="referenceDate">
  <String name="date">01/01/2000 00h00m00s</String>
  <String name="scale">UTC</String>
</AbsoluteDate>
<AbsoluteDate name="externalDate">
  <String name="date">01/01/2010 00h00m00s</String>
  <String name="scale">UTC</String>
</AbsoluteDate>
<AttitudeLawList name="lawList">
  <ComponentList name="AttitudeLaw">
    <!-- Amount of items -->
    <Integer name="nbItems">2</Integer>
    <ComponentListItem name="Item_1">
      <String name="lawName">LawName1</String>
      <String name="lawType">LOF</String>
      <LOFAttitudeLaw name="LOF_Att._Law:">
        <String name="lawEvol">Constant</String>
        <String name="LOF">LVLH</String>
        <Frame name="Inertial">
          <String name="name">GCRF</String>
        </Frame>
        <Boolean name="biasAngles">true</Boolean>
        <Rotation name="Rotation:">
          <String name="rotationOrder">ZYX Cardan angles</String>
          <Real name="psi" unit="deg">1.8E2</Real>
          <Real name="theta" unit="deg">0.0E0</Real>
          <Real name="phi" unit="deg">0.0E0</Real>
        </Rotation>
      </LOFAttitudeLaw>
    </ComponentListItem>
    <ComponentListItem name="Item_2">
      <String name="lawName">LawName2</String>
      <String name="lawType">Inertial</String>
      <InertialAttitudeLaw name="Inertial_Att._Law:">
        <String name="lawEvol">Constant</String>
        <Frame name="referenceFrame">
          <String name="name">EME2000</String>
        </Frame>
      </InertialAttitudeLaw>
    </ComponentListItem>
  </ComponentList>
</AttitudeLawList>
```

```

        </Frame>
        <Boolean name="biasAngles">false</Boolean>
    </InertialAttitudeLaw>
</ComponentListItem>
</ComponentList>
</AttitudeLawList>
<SwitchingConditionList name="switchList">
    <ComponentList name="AttitudeSequenceSwitch">
        <!-- Amount of items -->
        <Integer name="nbItems">1</Integer>
        <ComponentListItem name="Item_1">
            <String name="Law_before">LawName1</String>
            <String name="Law_after">LawName2</String>
            <EventSelector name="event">
                <String name="eventType">RELATIVE_DATE</String>
                <RelativeDateDetector name="eventData">
                    <DateOffset name="relativeDate">0j00h02m00s</DateOffset>
                    <String name="actionData">RESET_STATE</String>
                    <Real name="maxCheck" unit="s">1.0E10</Real>
                    <Real name="threshold" unit="s">1.0E-9</Real>
                </RelativeDateDetector>
            </EventSelector>
        </ComponentListItem>
    </ComponentList>
</SwitchingConditionList>

```

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