

# GPForceModels

De Wiki

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## How to call it

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

- With no arguments:

```
models = new GPForceModels("MyModels");
```

- with several **enum** and **boolean** parameters as arguments : these ones will allow making visible or not each kind of force. Anyway, potential has not such a **boolean** parameter as it will be mandatory to define a potential force model. But it is possible to customize which attraction model may be selected and event to force to a given one without no more possibility to change it. So, in the following examples, only potential (with **DROZINER** and **BALMINO** attraction models, the last one being the one by default), aerodynamic and radiative pressure forces will be displayed ...

```
AttractionModelsEnum[] attractionModelsAvailable = {  
AttractionModelsEnum.DROZINER, AttractionModelsEnum.BALMINO };
```

```
final boolean thirdBodiesForceIsVisible = false;  
final boolean aeroForceIsVisible = true;  
final boolean srpForceIsVisible = true;  
final boolean rediffusedSrpForceIsVisible = false;  
final boolean oceanTidesForceIsVisible = false;  
final boolean terrestrialTidesForceIsVisible = false;
```

```
models = new GPForceModels("MyModels", AttractionModelsEnum.BALMINO,  
attractionModelsAvailable,  
thirdBodiesForceIsVisible,  
aeroForceIsVisible,  
srpForceIsVisible,  
rediffusedSrpForceIsVisible,  
oceanTidesForceIsVisible,  
terrestrialTidesForceIsVisible);
```

If we had set:

```
AttractionModelsEnum[] attractionModelsAvailable = {  
AttractionModelsEnum.BALMINO };
```

BALMINO attraction model will be set by default and should not be displayed.

## Display

In case of calling [GPForceModels](#) with no arguments, the initial display will be:

The screenshot shows a GUI titled "MyModels" with a red close button and a help icon. Below it is a section titled "Earth Potential" with a red close button and a help icon. The "Attraction Model:" is set to "droziner" (selected with a radio button), with other options being "cunningham", "balmino", and "variable". The "Potential File Name" is a dropdown menu showing "GRIM4\_S4". The "Maximum degree and order:" is a text input field with the value "69". Below this are two text input fields for "Zonal" and "Tesseral", both with the value "0". A horizontal line separates this section from a list of force models, each with an "Active" checkbox: "Third Body", "Atmospheric Force", "Solar Radiation Pressure", "Rediffused Solar Radiation Pressure", "Ocean Tides", and "Terrestrial Tides". Another horizontal line follows. The "Earth's Ellipsoid:" section contains several parameters: "sma:" with a "Select" button and a text input field showing "6378.1363 km"; "flatness:" with "direct" (selected) and "inverse" radio buttons; "direct:" with a "Select" button and a text input field showing "0.0033536"; "inverse:" with a text input field showing "298.187022900763"; "frame:" with a dropdown menu showing "GCRF"; and "name:" with a text input field showing "Earth's Ellipsoid".

*Note: the potential is in error mode due to the fact that Droziner equations do not support a 0x0 field.*

We can see that an ellipsoid definition is also displayed: this is due to the fact that some force models will need it (atmospheric one for example). The fact that the different forces may be displayed does not mean that they will be considered for a next computation (except for potential of course). To do it, each item will have to be selected as, in the next example for "third bodies" perturbations ...

MyModels

Earth Potential

Attraction Model:

☐ droziner
☒ balmino

Potential File Name

GRIM4\_S4
▼

Maximum degree and order:

69

Zonal

8

Tesseral

8

---

Third Body

Active
☒

Moon

☒

Complex potential

☒

Open file

Potential File Name:

Moon.txt

Potential Type

GRGS
▼

Zonal

4

Tesseral

4

Sun

☒

Complex potential

☐

Venus

☐

Mars

☐

Jupiter

☐

---

Atmospheric Force

Active
☐

---

Solar Radiation Pressure

Active
☐

---

Rediffused Solar Radiation Pressure

Active
☐

---

Ocean Tides

Active
☐

---

Terrestrial Tides

Active
☐

---

Ephemeris type

☒ JPL
☐ Meeus
☐ Meeus Stela

Earth's Ellipsoid:

sma:

Select

6378.1363
km

flatness:

☒ direct
☐ inverse

direct:

Select

0.0033536

inverse:

298.187022900763

frame:

GCRF
▼

name:

Earth's Ellipsoid

## How to use it

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

```
ForceModelsData forces = models.getPatriusObject();
```

*Note: for the previous **V1.3(.1)** versions, it was mandatory to use the specific **GENOPUS CustomForceModels** class.*

## How it is stored

Here is the **XML** format for such a configuration:

```
<EarthPotentialForceModel name="Earth_Potential">
  <String name="attractionModel">droziner</String>
  <String name="potentialFileName">GRIM4_S4</String>
  <Integer name="zonal">8</Integer>
  <Integer name="tesseral">8</Integer>
</EarthPotentialForceModel>
<ThirdBodyForceModel name="Third_Body">
  <Boolean name="thirdBody">true</Boolean>
  <Boolean name="moon">true</Boolean>
  <Boolean name="sun">true</Boolean>
  <Boolean name="venus">false</Boolean>
  <Boolean name="mars">false</Boolean>
  <Boolean name="jupiter">false</Boolean>
</ThirdBodyForceModel>
<String name="ephemeridesType">JPL</String>
<OneAxisEllipsoid name="Earth's_Ellipsoid">
  <Real name="sma" unit="km">6.3781363E3</Real>
  <Real name="flatness">3.3536E-3</Real>
  <Frame name="frame">
    <String name="name">GCRF</String>
  </Frame>
  <String name="name">Earth's Ellipsoid</String>
</OneAxisEllipsoid>
```

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