

Forces

De Wiki

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[Forces](#)

This tab will allow determining which forces (and the associated models) will be applied in the propagation.

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Potential

First, of course, the user has to select a potential model (it is mandatory). To do it, the user will simply select the name of the model then the zonal and tesseral degrees and orders. Note that the tesseral order may not be lower than the zonal degree.

By default **GRIM4_S4** with **0x0** degree/order (so Keplerian motion) is selected.

Earth Potential *	
Potential File Name	<input type="text" value="GRIM4_S4"/>
Maximum degree and order:	<input type="text" value="69"/>
Zonal *	<input type="text" value="8"/>
Tesseral	<input type="text" value="8"/>

Note: in V11.0, we have also to select between Droziner/Balmino/Cunningham equation and Droziner (by default value) does not support 0x0 degree/order.

Third bodies

The user can select which other body will interact with the trajectory thanks to its potential attraction. Of course, the user can select several of these bodies (as Sun and Moon for example). Since V11.6.x, there is the possibility to use complex potential fields.

Third Body	Active <input checked="" type="checkbox"/>
Moon	<input checked="" type="checkbox"/>
Complex potential	<input checked="" type="checkbox"/>
<input type="button" value="Open file"/>	
Potential File Name:	<input type="text" value="Moon.txt"/>
Potential Type	<input type="text" value="GRGS"/>
Zonal	<input type="text" value="4"/>
Tesseral	<input type="text" value="4"/>
Sun	<input checked="" type="checkbox"/>
Complex potential	<input type="checkbox"/>
Venus	<input type="checkbox"/>
Mars	<input type="checkbox"/>
Jupiter	<input type="checkbox"/>

Atmosphere

Four models are available:

- **Exponential** (the simplest one)
- **MSISE2000**
- **US76** (average 45 North latitude model thus depending only on the altitude).
- **DTM2000**

For both **MSISE2000** and **DTM2000** models, the user will have to enter solar activity information with these three possibilities:

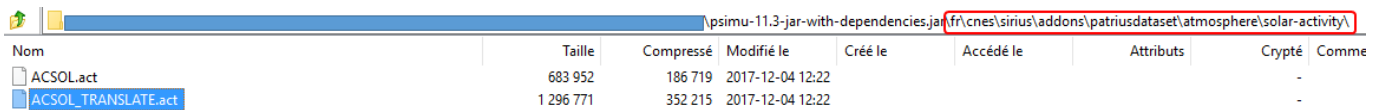
Atmospheric Force *	<input checked="" type="checkbox"/>
Atmospheric Model	<input type="radio"/> Exponential <input checked="" type="radio"/> MSISE2000 <input type="radio"/> US76 <input type="radio"/> DTM2000
Solar Activity Type *	<input type="radio"/> Real <input checked="" type="radio"/> Constant <input type="radio"/> By file
F107 *	<input type="text" value="150.0"/>
Ap *	<input type="text" value="35.0"/>
Multiplicative factor	<input type="text" value="1.0"/>

- The real one, stored inside [[PATRIUS_DATASET](#)] meaning that the propagation period must correspond to existing data
- A constant flux and geomagnetic index
- A variable flux and geomagnetic index read in a specific file (see [[PATRIUS](#)] documentation for the file format). Such kind of files already exist inside the **psimu-xx.x-jar-with-dependencies.jar**. To get them, you may :

1. open it using any tool an application allowing to work with compressed files as [7-Zip](#)
2. then go inside the archive in the *fr/cnes/sirius/addons/patriusdataset/atmosphere/solar-activity* directory => you will see two files (**ACTSOL.act** corresponding to the "real one" and

ACSOL_TRANSLATE.act corresponding to 11 years cycle translated data)

3. so, you just have to extract the file(s) from the archive ...



Nom	Taille	Compressé	Modifié le	Créé le	Accédé le	Attributs	Crypté	Comme
ACSOL.act	683 952	186 719	2017-12-04 12:22				-	
ACSOL_TRANSLATE.act	1 296 771	352 215	2017-12-04 12:22				-	

It is also possible to get other files extracting from this zip file [here](#).

Moreover, for these two models, we will need Sun ephemeris (choice displayed at the end of the tab).

Solar radiation pressure

If the user has selected such kind of force, he will have to keep or modify specific data linked to it:

- Reference distance to the Sun (1.4959787E11 m By default)
- Reference pressure (4.5605E-6 N/m² by default)
- Multiplicative coefficient (1. by default)

Solar Radiation Pressure *	<input checked="" type="checkbox"/>
Reference distance *	<input type="text" value="1.4959787E11"/> m
Reference pressure *	<input type="text" value="4.5605E-6"/> N/m²
Multiplicative factor	<input type="text" value="1.0"/>

If we select this option, we will need, as for some atmosphere, Sun ephemeris (choice displayed at the end of the tab).

Ephemeris type	<input checked="" type="radio"/> JPL	<input type="radio"/> Meeus	<input type="radio"/> Meeus Stela
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Rediffused solar radiation pressure

The user will just have to select or not if albedo and/or infrared component will be taken into account and, if yes, a multiplicative coefficient. If we select this option, we will need, of course, Sun ephemeris (choice displayed at the end of the tab).

Rediffused Solar Radiation Pressure *	<input checked="" type="checkbox"/>
Albedo *	<input checked="" type="checkbox"/>
Multiplicative factor	<input type="text" value="1.0"/>
Infrared *	<input checked="" type="checkbox"/>
Multiplicative factor	<input type="text" value="1.0"/>

Ocean and terrestrial tides

For ocean tides, the use will have to enter several specific data (see [[PATRIUS](#)] documentation) as for terrestrial tides, only selection will be necessary.

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