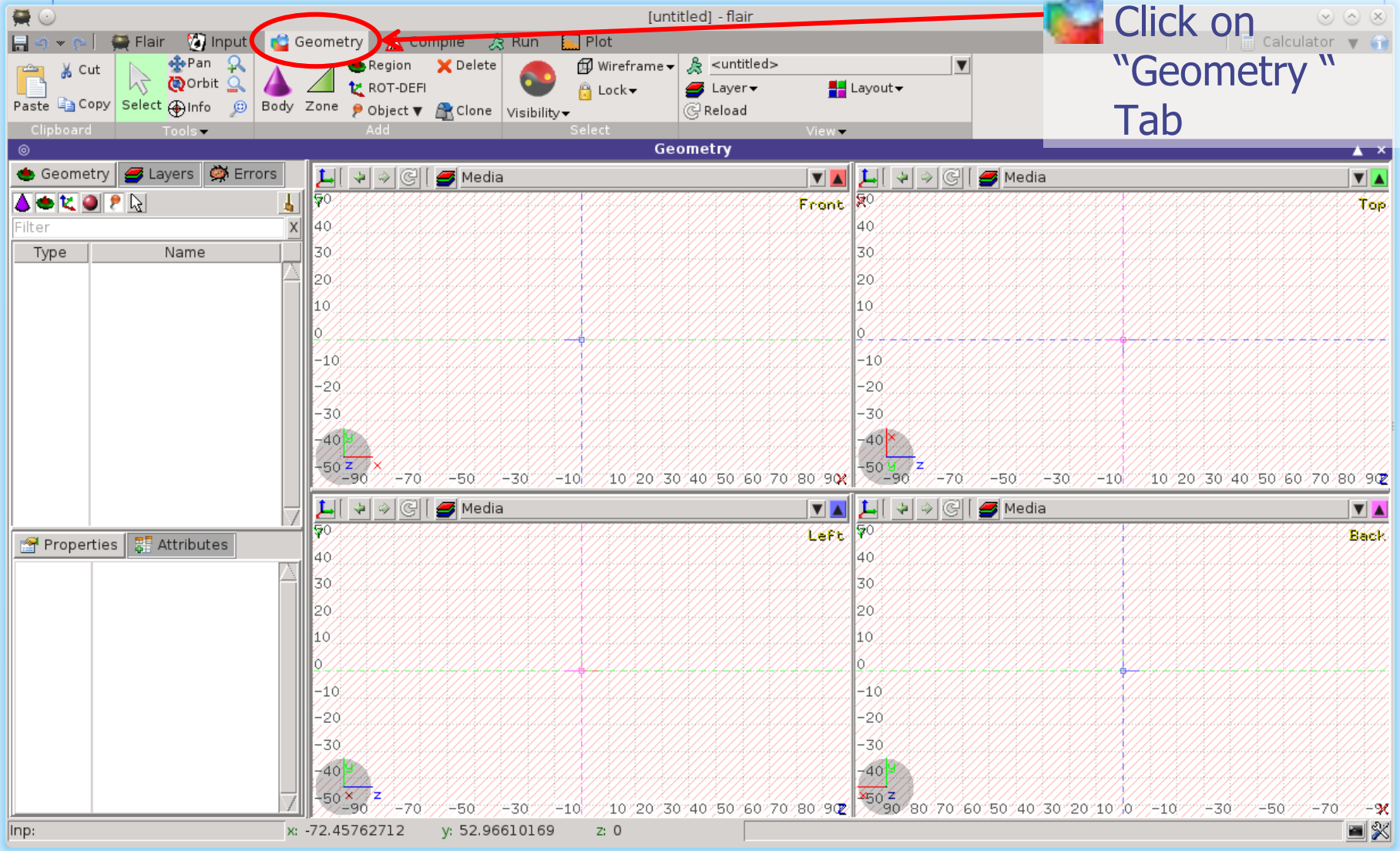
Flair – Geometry Editor – Part I

Advanced FLUKA Course

Starting the Geometry Editor



Click on "Geometry " Tab

Geometry editor

- Working on 2D cross sections of the geometry;
- Interactive visual editing of the geometry in 2D;
- Debugging bodies/regions in a graphical way;
- Fast 3D rendering of the geometry;

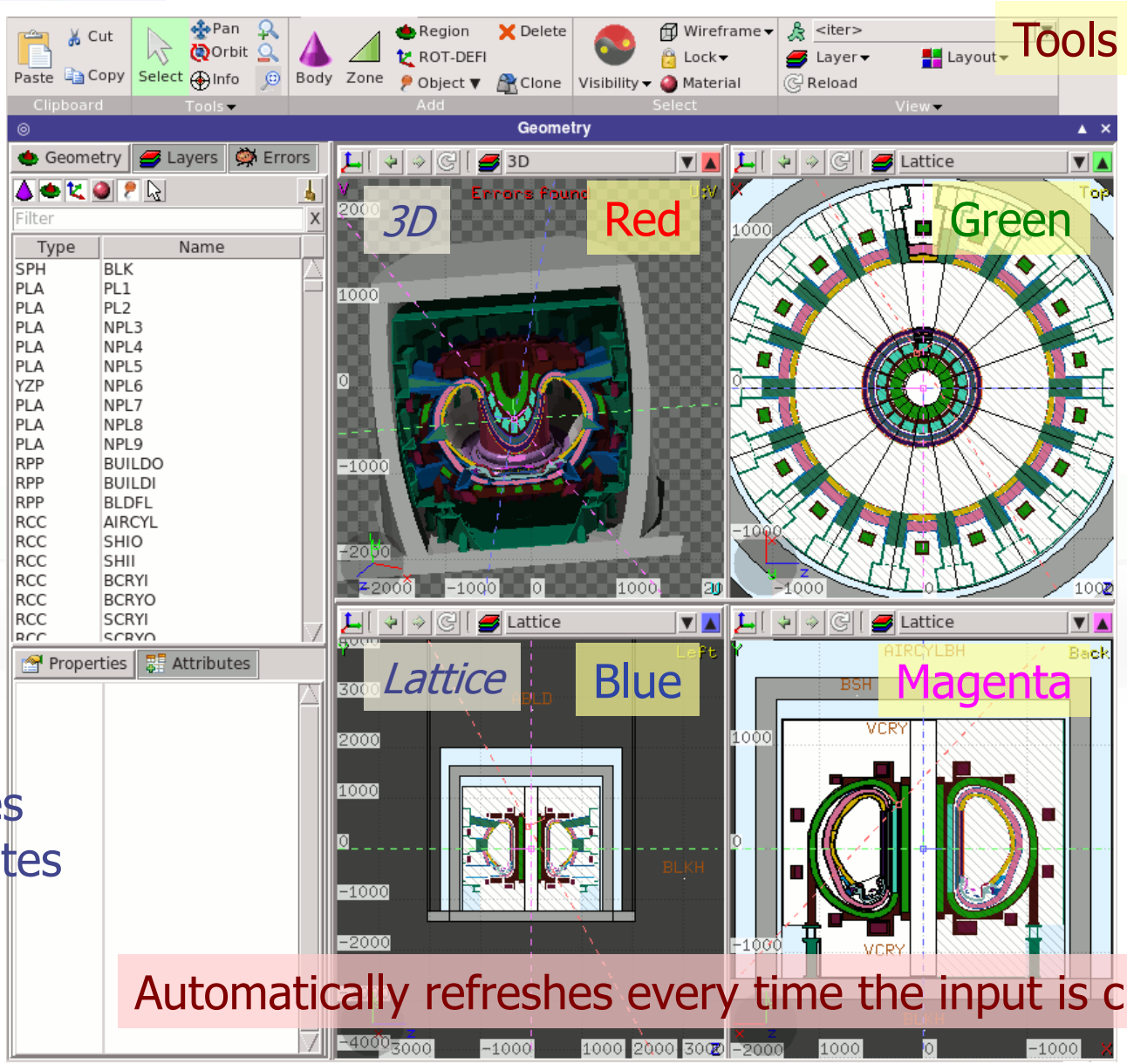
Pros

- Fast display of complex geometries;
- Many user-customizable layers;
- Graphical editing of the bodies with snapping mechanism to generate accurate coordinates;
- Visual selection and editing of zones w/o the need to know the orientation of bodies;
- Use real curve of bodies with no conversion to vertices/edges;
- Interactive debugging with information of problematic bodies, regions and/or zones;

Cons

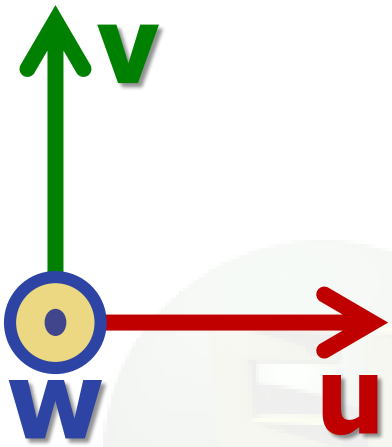
- Tricky to orientate in an unknown geometry;
- Difficult to find region using the expression;

Geometry Editor: Interface



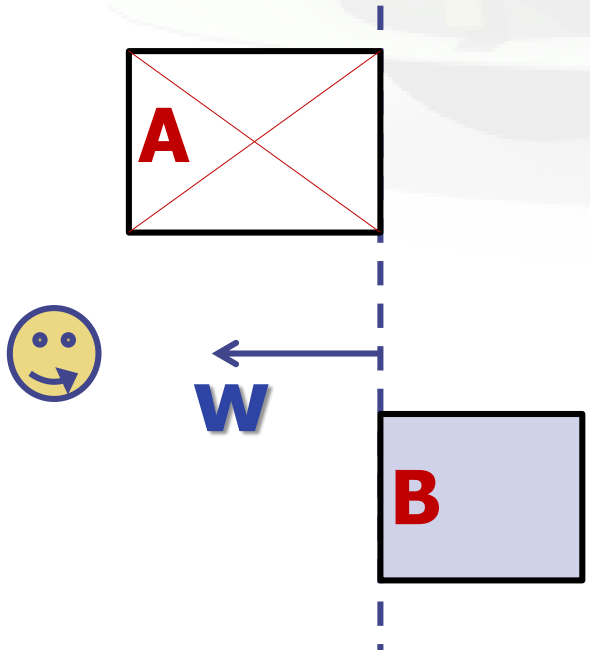
Automatically refreshes every time the input is changed

Viewport axes System



Each viewport is defined by:

- Origin center of viewport
- Basis relative axes system u, v, w. w is coming out of the screen towards the user
- Extends zooming



Note:

- Each viewport is facing towards negative **–w**
- If bodies A, B are touching the viewport like on the plot.
- Only body B will be visible

Navigation - Keyboard

[*arrows*]	pan viewport
Ctrl + [*arrows*] + [Shift]	orbit viewport around **u,v** axes rotates by 90°
Page Up/ Page Down	pan viewport front/back
Ctrl + PgUp/PgDn	rotate viewport around **w** axis
= / -	zoom in / zoom out
o	open projection dialog to set the **o**rigin/basis/save/recall etc…
Ctrl-0 (zero)	Center to origin
Ctrl-1, Ctrl-2	**front [X:Y] / back [-X:Y]**
Ctrl-3, Ctrl-4	**left [Z:Y] / right [-Z:Y]**
Ctrl-5, Ctrl-6	**top [Z:X] / bottom [-Z:X]**

Assuming: *Z = direction of the beam (horizontal)*
X = horizontal
Y = vertical

Navigation – Mouse [1/2]

With the left mouse button:

1. Select the appropriate action pan/orbit/zoom with:
   I. Menu → Tools
   II. Toolbar
   III. Keyboard shortcut
2. Click and drag the desired viewport

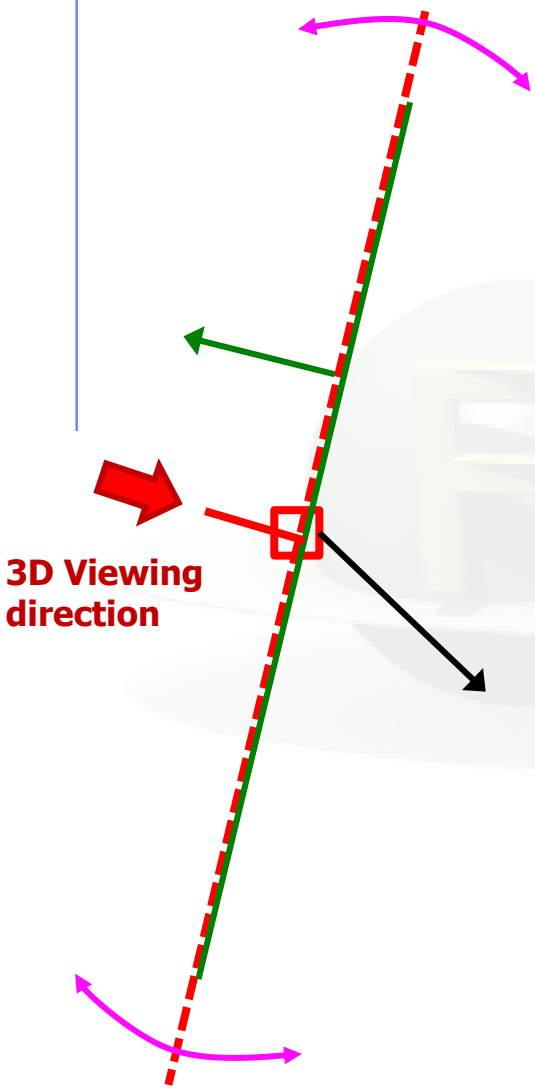
	function	key	description
	Pan	x	Pan viewport
	Orbit	t	Orbit viewport using a virtual **t**rackball
	Zoom	z	Drag area to **z**oom In ([**Ctrl**] to zoom out)
		Shift-Z	Zoom viewport on selected items
		Alt-Left	Go to previous in history projection
		Alt-Right	Go to next in history projection
	Center	c	Center all (non 3D) viewports to mouse location

Navigation – Mouse [2/2]

- With the middle mouse button
  - Click centers clicked position (defines it rotation center)
  - drag Pan/Move viewport
  - Ctrl orbit projection using a virtual trackball
  - Ctrl-Middle-Shift orbit projection using a virtual trackball with steps of 15 degrees
  - Shift select rectangle region and zoom into
  - Shift-Middle-Ctrl select rectangle region and zoom out
- Wheel (if any) zoom in/zoom out
  - Ctrl-Wheel pan/move forward or backward
  - Ctrl-Shift-Wheel smoother pan/move forward/backward
- With the right mouse button
  - alone opens popup menu
  - Shift pan/move viewport
  - Ctrl orbit projection using a virtual trackball

- When laptop mode is enabled in the Preferences/Geometry then the middle and right buttons are swapped

Navigation – Viewport lines [1/2]



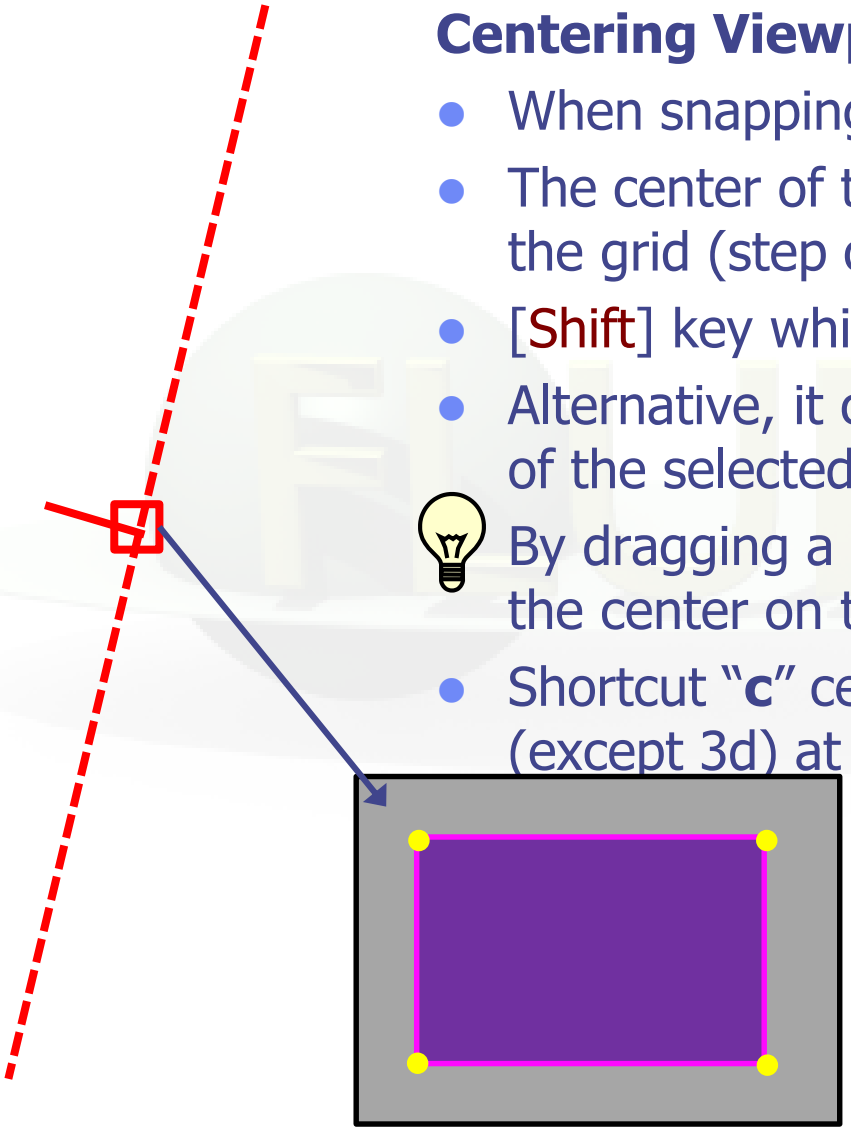
Description:

- Dashed lines represent other viewports (the intersection of other viewports with the current one);
- The center is represented with a square;
- Viewing direction **w** is indicated by a short line;
- When another viewport is outside the view window, the viewport-line will be displayed on the closest edge;

Actions: Select + left mouse button

- Drag the center square to reposition the viewport
- Drag the line close to the center to reposition the viewport along the vertical **w** axis
- Drag the extremities to rotate it

Navigation – Viewport lines [2/2]

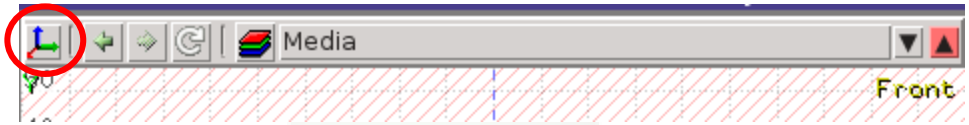


Centering Viewports

- When snapping to grid is activated
- The center of the viewport will be aligned to the grid (step of 1/10 of the main grid)
- [Shift] key while toggle the snapping action;
- Alternative, it can be centered on the vertices of the selected bodies;
- By dragging a viewport center it always moves the center on the current viewing plane.
- Shortcut "**c**" centers all other viewports (except 3d) at the mouse pointer

Navigation – Projection dialog

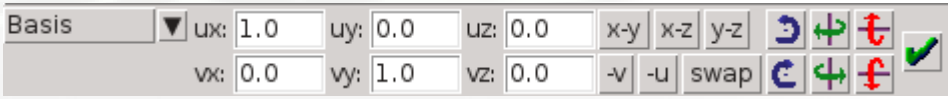
With the projection [**o**] button you can change, move, shift, rotate, save and reload the projection of a viewport



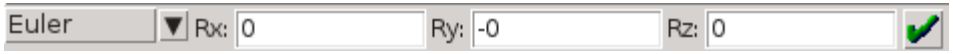
Shift the coordinate system

Set the **o**rigin of the viewport

Change the reference axis



Rotate around the Cartesian axis

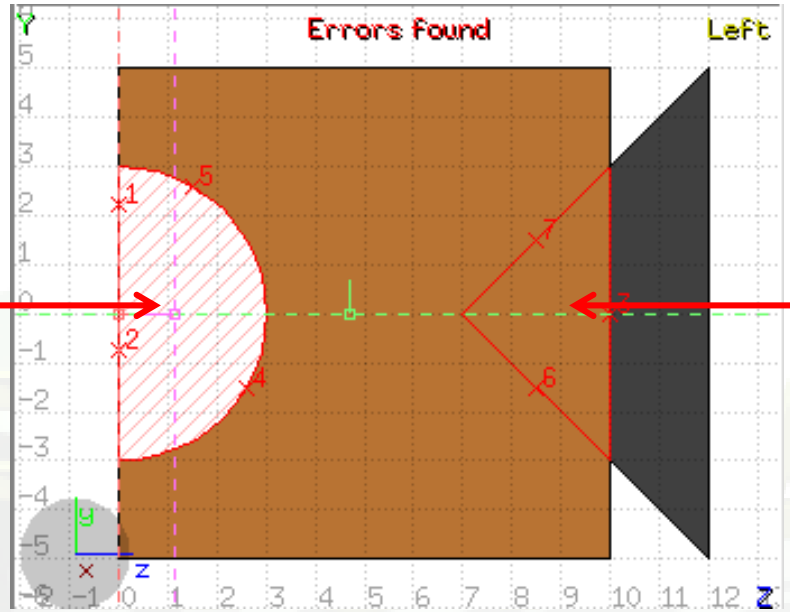


Shortcut: Ctrl + (1-6)

Add and Select Bookmark

Select Transformation

Debugging Geometry Errors



Errors found notifies that are errors in the geometry (on the current projection):

- The areas affected by the errors are outlined with a **Red** stroke:
  - Areas filled with a full color correspond to overlapping regions;
  - Areas filled with red lines correspond to a missing region definition;
  - Body segments that are involved in the errors are numbered;
- Clicking the  Errors tab (on the left) displays the dialog with the errors.
- Touching surfaces are checked against **10** significant digits
- Non-strictly geometrical errors (i.e. missing Material Assignment to a region, non recognized cards) are also notified;