

## ESPSS 3D viewer in Monitor: short specifications for 3D surfaces, 3D trajectories (lines in 3D), 3D graphs, ...

Reference : TriaXExcelPro tool with data coming from Excel sheet, <ftp://ftp2.kopoos.com/kopoos/TriaXExcelPro.zip>

- 1) General: need of Monitor integrated 3D viewer with in live full authority by user to: orient, zoom in, zoom out, move, plot the axis x,y,z (with a distinction for X at least), make iso-view with any wanted axis up (x or y or z), select the origin of plot at 0,0,0 or view local with origin at one of the data point, colors for background, color for foreground given by a dynamic data of the model, size of points, size of lines.
- 2) General features: automatic iso-scale (same for all axis).
- 3) 3D surfaces by dots (Ref. Example 3 D dynamic surfaces of liquid in several tanks )  
Dynamic plot of dots specified by 3 data x, y, z (or a vector for all possible indexes, the last one being x,y,z. (Example from SATELLITE Lib of ESPSS: Tanks1.MapFreeSurface[1,0001,x] first index 1 to the max, second index 1 to the max, third index x to z or 1 to 3).  
No history, only the data available at the current time (similar to histogram "many variables instantaneous"). However, it would be interesting to keep a history of the dots to see the "movie" in mode pause of the Monitor. The size of the dots should be modifiable by the user.
- 4) 3D trajectories (Ref. Example 3 D orbital trajectories)  
Plot of line from previous point to the current orbital point specified by 3 data x, y, z, hence with historical trace (Example from SATELLITE Lib of ESPSS: Frame1.S.R[Xq], Frame1.S.R[Yq], Frame1.S.R[Zq]).  
Important color of the current point specified by a dynamic data like Thrusters1.logEventsThrusters(-) that produce a major (red) color when the string is not empty or else minor (green) color.  
Moreover, the quaternion  $q_1(=\cos \theta/2)$  and  $q_2$  to  $q_4$  are used to orient a body (simplified satellite) with respect to the main (inertial) frame centered to the current orbital point (Example from SATELLITE Lib of ESPSS: Frame1.S.Q[1 to 4](-)). The dynamic data like Thrusters1.logEventsThrusters(-) is used to add to the body a thruster plume when the string is not empty.  
For an extension, an other quaternion can be used to orient the solar array with respect to the main frame.  
Note: the colors of the body should be different for each of the 6 faces  
In addition, and this is very useful too to get the full picture of the trajectory, the 3D dynamic trajectory could be enhanced with the projection on the 3 faces of the foreground cube (see cubic feature of TriaXExcelPro tool). The size of the foreground cube could be equal to the double length of the x,y,z axis, and this length should be modifiable by the user.  
In option, the body could be specified (not a simplified satellite) by the user for more realistic outputs.
- 5) 3D graphs: similar to the 2-D Table Editor Z versus X,Y. That is probably covered by the §3) above with the 3D surfaces by dots, except that interpolations between dots are used for making a real surface...

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