An Interactive Presentation of Maple 3D Graphics in PDF Documents – Supplemental Material

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Creating 3D animation in U3D

Figure 1 shows an animation for demonstrating the topic of function contours. Single objects (the function, plane and function contours) were created in Maple and exported one by one into VRML. The corresponding worksheet can be downloaded from the address `http://www.math.muni.cz/~plch/eJMT/`. Now let us describe creating this animation in greater detail.

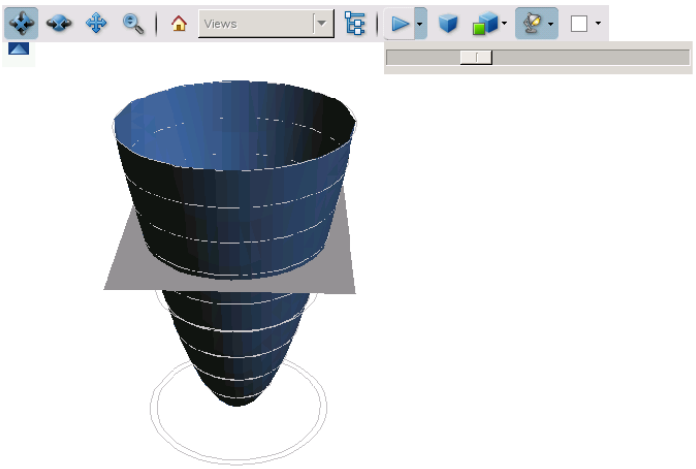

Figure 1: An animation in U3D

1. In Deep Exploration we open, one by one, the VRML files already prepared in Maple (with "Merge File"): `surface.wrl`, `plane.wrl` and `contours.wrl`.

2. In the option "Scene Tree", we designate, for convenience, the objects whose movement we are going to animate by name ("Rename") and create copies of the contours we are going to move with ("Duplicate"). Another possibility is to open the `contours.wrl` file again.

3. We select the "Animation Control" and "Animation Timeline" in the Menu "View" - "Controls and Toolbars". We must also set the properties of the animation when starting its creation – by double–clicking on the "Animation Control" at the bottom of the screen we bring up the "Animation Options" dialog. We select "Add" to create a new animation sequence. By double–clicking on it we bring up the properties dialogue (length, number of frames per second, etc.) and we set the "Frames" to 120.

4. We select the plane by the left–click in the "Scene Tree". In the part "Animation Controls", we right–click on Time 0 and select the "Insert Key". There appear the items "Position", "Rotation" and "Scale" under the name of the animation in the "Animation Controls".

5. We select "Position" and we set the "Key properties" by the right–click (in this case we only check the setting: "Time=0, X=0, Y=0, Z=8").

6. We move the "Animation Timeline" slider to the position 120/120 (the last frame in our animation). We add "Key" in Time 120 of the "Animation Controls" and we change "Z=0" in the position of the plane (X and Y are left without a change). Now we can play the animation of the moving plane by electing to "Start the animation" in the "Animation Timeline".

7. We repeat the same process with each of the contours (we set their z–coordinates in the given time periods).

Another possibility is to create the movement of single parts of an object with a mouse. In that process we start by the "Edit Keyframes", then we set the time position in the "Animation Timeline" and drag the objects into the desired position – it may also be helpful to select "Move Pivot Point to Object Center" from the "Tools" Menu: it makes objects easier to move. However, our experience shows that the latter method is suitable only for very simple animations.