

B Tech-III (CO) 6th semester

Course: Computer Graphics (CS-3) (CO306)

Tutorial – 8

Based On: 3D Transformations

1. Given a rectangular parallelopiped which is unit distance on Z-axis, 2-distance on X-axis and 3-distance on Y-axis. What is the effect of scaling when scaling factor $S_x = 1/2$, $S_y = 1/3$ and $S_z = 1$?
2. A rectangular parallelopiped is given having length on X-axis, Y-axis and Z-axis as 3, 2 and 1 respectively. Perform a rotation by an angle -90° about X-axis and an angle 90° about Y-axis.
3. For the given matrix,

$$\begin{bmatrix} 2 & 0 & 1 & 0 \\ 1 & 3 & 0 & 0 \\ 4 & 0 & 1 & 0 \\ 0 & 3 & 6 & 1 \end{bmatrix}$$

First apply a rotation of 45° about the Y-axis followed by a rotation of 45° about X-axis.

4. Perform reflection of unit cube about the XY plane.
5. Transform the given position vector [3 2 1 1] by the following sequence of operations,
 - Translate by [-1 -1 -1] in [x y z] respectively.
 - Rotate by 30° about X-axis and 45° about Y-axis.
6. Define tilting as a rotation about the x axis followed by a rotation about the y axis:
 - Find tilting matrix
 - Does the order of performing the rotation matter?