

Review of 3D Transformations and Projections

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Rotations

- Usually represented around x, y or z axis
 - $R_x(\Phi) = ?$
 - $R_y(\Phi) = ?$
 - $R_z(\Phi) = ?$



Rotations-2

- **Rotating from one direction to another**
 - **Angle between two vectors V_0 & $V_1 = ?$**
 - **Direction normal to two vectors = ?**



Translation

- **Move each point by $(\Delta x, \Delta y, \Delta z)$**
 - **Matrix notation for translation is ?**



Scaling

- **Scale x-axis by S_x**
- **Scale y-axis by S_y**
- **Scale z-axis by S_z**
- **Matrix notation for Scaling is ?**



Homogeneous transform

- **One 4 x 4 matrix that can represent Rotation, Translation and Scaling**
- **Combination of transforms**
- **Reversing transforms**



Projecting 3D on to 2D

- **Orthographic projection**
 - Object far away & nearby look the same
 - Equations ?
- **Perspective projection**
 - 2D (x,y) image is scaled by depth (Z)
 - Equations ?



Stereo

- **Two 2D image planes**
- **Simplest case --- stereo images translated along x-axis by dx**
- **Equations ?**
- **General case --- vergence & torsion**

