

# Transformations

3D scene lives in a coordinate system

# Elements of 3D scene are described with vectors

- Vectors
- Points
- Normals
- Rays

Elements of 3D scene are moved using  
matrix operations

- TODO

# Important matrices are transformation matrices

- Modeling elements, 3D scene and animations relies on transformations
  - Translation
  - Rotation
  - Scale
  - Look-at notation

# Translation

# Scaling

# Rotation



# Moving directed objects

- Camera movement using look-at notation

# Matrix and coordinate system

- Relationship between matrix and coordinate system

Special care: transformations on normals

# Other coordinate systems

# Literature

- <https://github.com/lorentzo/IntroductionToComputerGraphics/wiki/Foundations-of-3D-scene-modeling>