Computer Graphics

Lecture 29
Grad presentation: Wave Simulation
A bit on animation
Animation
Animation

• Time-varying scene/model. That's pretty much it.
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• Big challenges:
Animation

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• Big challenges:
  • tedium
Animation

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• Big challenges:
  • tedium
  • realism
Animation - Tedium

- **Keyframing** + interpolation

Linear interpolation? Spline interpolation?
Animation - Tedium

• Rigging

• Surface is deformed by a set of bones
• Bones are in turn controlled by a smaller set of controls
• The controls are useful, intuitive DOFs for an animator to use
Animation - Tedium

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Modeling DOF \neq Animation DOF
Animation - Tedium

Walk cycle
Interpolating Rotations

• Representation matters a lot - linear interpolation of rotation matrices are not rotation matrices.

• Quaternions are one answer
  • 4D vectors that make spherical interpolation nicer
Animation - Tedium

Forward Kinematics

Inverse Kinematics
Animation - Realism

• Tron (1982)

• Tron Legacy (2010)

• How to Train Your Dragon 2 (2014)
Animation - Realism

Motion capture

- A method for creating complex motion quickly: measure it from the real world
Animation - Realism

Motion capture in movies
Animation - Realism

Motion capture in games
Animation - Realism

- Motion capture technologies:
  
  - Magnetic
  - Mechanical
  - Optical
What else?

- Radiometry and light transport
- Global illumination
- Color theory
- Image/signal processing
- Perception science
- Visualization