CS130 Exam 2 Material Outline

Homework

- Homework 6 : Texture mapping, ray tracing
- Homework 7 : Practice Test 2

Labs

- Lab 5 : Texture Mapping
- Lab 6 : SLERP
- Lab 7 : Ray Tracing
- Lab 8 : Bezier Curves
- Lab 9 : Subdivision

Assignments

- Assignment 2: Ray Tracing
  - View rays, shadow rays, reflection rays
  - Object-ray intersections
  - Phong reflection model

Lectures

1. Texture Mapping
   - Coordinate Systems
   - Intermediate Surfaces
   - spherical, cylindrical, box mappings
   - mapping from actual shape to intermediate shape (position, surface normal, centroid)
   - Parametric surfaces
   - Triangle texturing
   - Multitexturing
   - Aliasing, Magnification, Minification
   - Mipmapping
   - filtering, point sampling
   - Perspective correct interpolation
   - Environment mapping

- Shadow mapping, bump mapping, normal mapping

2. Rotations
    - rotation about arbitrary axis
    - composite transformations
    - Euler Angles
    - Gimbal Lock, extrinsic and intrinsic rotations
    - Quaternions
    - Slerp
3. Raytracing
    - basic algorithm components: cast, intersect, shade, recursion
    - Anti-aliasing raytracing techniques
    - soft shadows
    - soft focus
    - soft reflections
    - motion blur
    - acceleration structures: bounding boxes, spatial partitioning, bounding volume hierarchy

4. Curves

   - goals: local control, smoothness and continuity, derivative evaluation, stability, ease
   - Parametric curves, tangent vector to
   - Reparameterization
   - Piecewise curves
   - continuity C0, C1, ..., Cn, G1
   - higher order polynomial interpolation: overshoots and non-local effects
   - Blending functions
   - Cubics
   - Cubic Hermite Curves. blending
   - Bezier Curves, blending, subdivision
   - Parametric surfaces, tangent plane to
   - Bezier surface patches