Project: Waterboat

Group: PhysIT
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Simulation scenario

- Water/boat simulation and controls
- Motivation: Implement realistic boat controls for video games.
- Implementation of particle based water simulation, coupling of fluid and rigid bodies, external control forces.

Simulation methods

- Particle-based fluid modeling (SPH).
- Both way fluid-rigid body coupling.
- Forces:
  - Water suction/propulsion for jet engine controls. Water disappears/appears with motion.
  - External wave generating forces.

Minimal target

- **Moving water simulation.**
- **Floating rigid body boat.**

Desired target

- Moving water simulation.
- Floating rigid body boat.
- **Hydro powered jet engine effect that causes splashes/creases in the water.**
- **Engines also affect the boat as controls.**

Bonus target

- Moving water simulation.
- Floating rigid body boat.
- Hydro powered jet engine effect that causes splashes/creases in the water.
- Engines also affect the boat as controls.
- **Water ocean rendering.**
- **Large wave simulation which the boat can jump of off.**
- **Multiple real time boats with rigid boat/boat collisions.**

Milestones

- Add a container with unrendered simulated water in 3D.
- Introduce a boat that floats.
- Attach a suction/expulsion mechanism to the boat.
- Add motion controls caused by propulsion of 2 engines.
- Render the water so it looks like the ocean.
- Add an external force that generates large waves.
- Balance performance/realism to achieve real time controls.
- Introduce multiple boats.
- Implement rigid body collision between boats.

Questions?