Real-Time Eulerian Fluid Sim

Ishan Ranade and Salaar Kohari

Real-Time Eulerian Water Simulation Using a Restricted Tall Cell Grid
Nuttapong Chentanez and Matthias Muller
NVIDIA PhysX Research

Milestone 1 Review

Milestone 2

- Ray tracing with intersection instead of marching
- Hierarchy structure for rendering acceleration
- Water texture projection

Ray Casting

- Ray-sphere intersections instead of ray marching for more speed and accuracy
- Octree to reduce number of intersection tests

Textures

- Water texture projection with modification depending on deformation/velocity

Remaining Work

Scalability

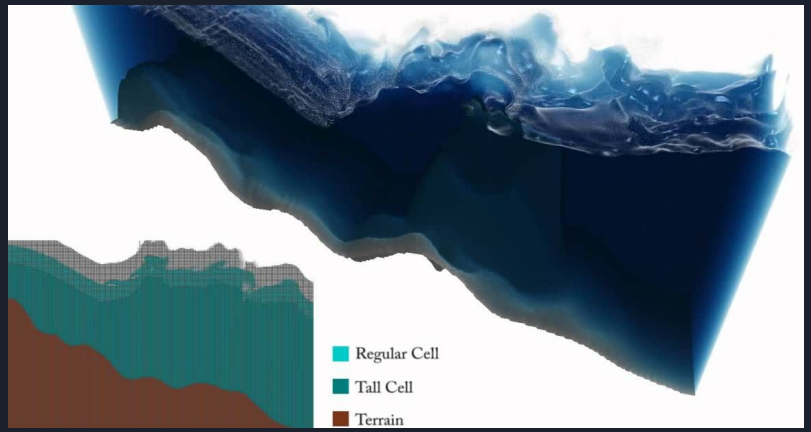
- Allow for real-time water simulation in a larger environment
- Blend fake/simple simulation with main simulation

Translucency?

- Render first pass without water
- Render water pass and blend based on depth
- Use angle of incidence for refraction/caustics

Tall Cells

- Adaptive MAC grid with tall cells to reduce computation below the surface
- Transition cells between regular and tall depending on distance to surface



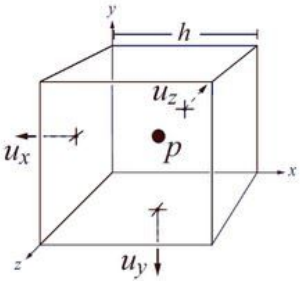


Figure 1: A MAC grid cell. Velocity components, u_x, u_y and u_z, are stored on the minimal faces of the cell. Pressure, p, is stored at the cell center.