Position-based fluid simulation

Overview
In fluid simulation, enforcing incompressibility is crucial for realism; it is also computationally expensive. Recent work has improved efficiency, but still requires time steps that are impractical for real-time applications. Macklin and Muller [1] present an iterative density solver integrated into the Position Based Dynamics framework (PBD). By formulating and solving a set of positional constraints that enforce constant density, their method allows similar incompressibility and convergence to modern smoothed particle hydro-dynamic (SPH) solvers, but inherits the stability of the geometric, position based dynamics method, allowing large time steps suitable for real-time application

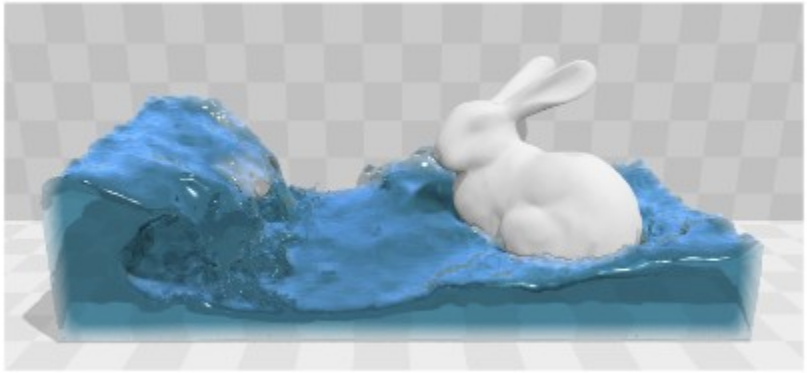

Figure 1: Position-based fluids [1].

Project
Implement position-based fluids based on the method of [1]. Your fluid simulator should also allow for fluid-rigid interactions (boundary conditions). Try to design your simulator such that it allows for real-time performance for a large number of simulated particles. Parallelism should be used to speed-up computations.

References
[1] **Position based fluids.** M. Macklin and M. Muller. ACM Transactions on Graphics (TOG) - SIGGRAPH 2013 .