

Real Time Rendering - Phluid Fysics

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1 Introduction

Our goal is to visualize water that flows through the scene. The simulation of the water is done with the PhysX engine. The physics engine uses a number of particles to simulate the fluid. Smoothed Particle Hydrodynamics (SPH), which is a method for solving physical problems governed by partial differential equations, is used to compute the behavior of the fluid.

2 Effects

In the following section we describe all effects we have implemented.

2.1 Shadow Mapping

To enhance the realism of the rendered scene we have implemented Shadow Mapping as described in the lecture. This technique was introduced by [Williams 1998].

2.2 Relaxed Cone Stepping for Relief Mapping

Some objects in our scene are rendered with Relaxed Cone Step Mapping. The basic algorithm was introduced by [Policarpo et al. 2005] and the relaxed cone approach is described in [Policarpo and Oliveira 2007].

2.3 Screen Space Meshes

To be able to render the water/fluid, which is a three-dimensional point cloud that is computed by the physics engine, we use Screen Space Meshes as described by [Müller et al. 2007]. This technique generates a triangle mesh in screen space and transforms it back to world space.

2.4 Generic Refraction Simulation

The rendering of the water/fluid (screen space mesh) is done with Generic Refraction Simulation as described in [Sousa 2005]. Whereas the reflection is looked up from a static environment map and the refraction is computed dynamically.

References

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