

## ABSTRACT

This final project presented two-dimensional Smoothed Particle Hydrodynamics simulations (SPH) with surface particle detection methods. Fluid dynamics is the scientific disciplines that studies the behavior of liquids and gases at rest or moving. Basic fundamentals of fluid dynamics problems governed by the Navier-Stokes and continuity equations. In completing these equations can be used Smoothed Particle Hydrodynamics (SPH) method. SPH is a method that often used to simulate the fluid dynamics because it can discretize the fluid domain into SPH particle shape. In this final, SPH simulations is used to create two-dimensional dam break. Simulations are made with searching the surface shape using surface particle detection method. From testing using the SPH method shows good results for simulation liquid and solid objects. Dam break simulation results with 5123 SPH particles and a duration of 3 seconds show a fairly realistic visualization to describe the movement of fluid. On the surface particle detection test showed significant influence of neighborhoods between the particles, if the radius of the selected neighborhoods is right can be obtained surface with lower errors detection of interior particle. On the application of particle detection method for dam break simulation with 5123 SPH particle, the neighborhoods radius 0.063 selected as the optimal radius. While constraints on testing particle detection methods are difficult to apply to particles that having a low density, because there will be errors in surface particle detection where most of the interior particles will be considered as the surface particles.

*Keywords: Smoothed Particle Hydrodynamics (SPH), surface particle detection method.*