Simulation and Visualization of Tsunami Using Virtual Reality Technology

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ABSTRACT

Tsunami kill many human beings and damages economic activities seriously, such as tsunami caused by the Great East Japan Earthquake in 2011. It is very important to develop a useful simulation method for tsunami waves in order to perform the planning and design for the community development and the prevention of disaster. The visualization is also important to understand the power of tsunami and to improve the consciousness of disaster prevention. Recently, the visualization using the virtual reality (VR) technology based on binocular vision is becoming more popular for the visualization of three dimensional numerical simulations [1].

In this presentation, the simulation and visualization methods are presented for tsunami waves using virtual reality technology. The stabilized finite element methods are employed for 2D and 3D tsunami simulations using the shallow water equation [2], Boussinesq equation and Navier-Stokes equation. The computed results obtained by the present methods have been compared with the exiting experimental and other numerical results. We also propose a visualization system using virtual reality technology [3] to improve the quality of education for disaster prevention. The present simulation and visualization methods are shown to be useful tools to realize the high quality computing for large scale tsunami simulation.

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