

Modeling and Simulation for Safety and Environmental Problems Using Virtual Reality Technique

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A number of natural disasters such as floods, storm surges, tsunamis occur annually in various parts of the world. Also, the environmental flow problems such as heat-island, water/air pollution and traffic noise problems are becoming important issues in urban area. In order to estimate the extent of the effect quantitatively, it is necessary to evaluate the behavior of physical phenomenon which causes the problems. Also, it is important to prepare an accurate shape model and an adequate mesh for landform, buildings and civil structures.

In this presentation, simulation and modeling methods for safety and environmental problems related to wind, river and coastal flows are presented. The stabilized finite element methods are employed for the spatial discretization. We also propose a pre- and post-processing system based on virtual reality technique to make the overall computational tool set a high-quality simulation environment. The present methods are applied to several numerical examples and are shown to be useful tools for the evaluation of safety and environmental problems.