

ABSTRACT

Hoon, Vincent Joseph. M.S., Purdue University, December, 2007. Visualization of Discrete Element Method Simulations. Major Professors: Carl Wassgren and Ananth Grama.

In this thesis a system for scientific visualization of particle simulation data is presented. The specific simulation datasets the system is designed to handle have been produced using the discrete element method (DEM), and are targeted to the study of granular materials. The resulting visualization tool, named “ParticleVis,” has been developed to handle a wide variety of information produced using DEM simulations.

The methods and algorithms used by the visualization system include vector visualization, shading techniques for high performance rendering of spheres, and volumetric rendering. The interface and software design of the visualization application itself are also addressed. Two case studies which demonstrate the usefulness of the system in the context of the discrete element method are also presented.