

A Collision Contact Modeling Method for Rigid Bodies Represented as Triangle Meshes

ABSTRACT: In this paper, a collision contact modeling method for virtual reality environments is presented. Models in virtual environments are typically represented using triangle meshes. Most traditional collision contact simulations require the surface information of rigid bodies. This makes traditional collision contact simulations inapplicable for most virtual environments. This paper presents methods to model the behavior of colliding objects in virtual environments using triangle mesh representations of the objects. RAPID is used to obtain the approximate collision contact information between individual triangle meshes. Impulse calculations are combined with the collision detection to simulate post-collision behavior of objects. A three-point method is introduced to calculate the final resting place of objects or calculate unstable equilibrium and further dynamics of objects. These methods have been integrated with the Virtual Assembly Design Environment (VADE) to enhance VADE's existing dynamics simulation capabilities. A series of test cases are presented and analyzed to validate these new methods.