

Functionality to Facilitate Assembly of Heavy Machines in a Virtual Environment

ABSTRACT: This paper describes a methodology for simulating the virtual assembly of heavy machinery. Heavy machinery or parts are described in this paper as objects too heavy to safely lift with two hands. Virtual assembly of heavy machinery poses special problems that are not seen in assemblies composed of parts easily manipulated with human hands. This paper identifies some of the difficulties associated with real-time virtual assembly of heavy machinery, and proposes methods for addressing these problems. We describe a method for reorganizing the assembly tree outside of traditional CAD systems to better simulate assemblies with numerous parts. This allows the user to control the assembly sequences, which are simulated in the virtual environment without changing the assembly hierarchy of the original CAD model. This paper also proposes methods for simulation of overhead cranes and the physical modeling of crane-part interactions, providing real-time virtual manipulation of heavy objects.