

Docket #: S06-178

An Exact Dynamic Collision Checker for Animation and CAD/Robotic Applications (MPK)

Stanford researchers have developed an Exact Dynamic Collision Checker for Animation and CAD/Robotic Applications that is both infallible and efficient. The Motion Planning Kit (MPK) introduces a new method that automatically adjusts the sampling resolution and allows multiple objects to exist and move simultaneously.

Additional techniques and heuristics further improve the efficiency and allow dynamic collision checking of situations with many moving objects and high geometric complexity, such as those with articulated robot arms and/or multiple robots.

For details about MPK: [MPK - Motion Planning Kit](#) or [Adaptive Dynamic Collision Checking](#)

Applications

- Computer-aided design of mechanical assemblies
- CAD-based programming of industrial robots
- Machine tool programming
- Graphic animation of virtual characters and digital actors
- Haptic interactions – devices that allow the manipulation of simulated 3D objects in a virtual environment
- Surgical simulation
- Robotic surgery
- Virtual reality
- Video games

Advantages

- Frees the user to do real time animation without having to do a sampling resolution while doing a dynamic collision check along a motion trajectory.
- Exact and reliable detection of a collision along a motion trajectory.
- Computationally efficient through the use of adaptive resolution during dynamic collision checking.

Publications

- [Adaptive Dynamic Collision Checking for Single and Multiple Articulated Robots in Complex Environments](#) , F. Schwarzer, M. Saha, and J.C. Latombe. IEEE Tr. on Robotics, 21(3):338-353, June 2005

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