

*Convergence of an impulse based scheme for rigid multibody models*

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We follow an approach that was pioneered by Hahn [1] and expanded upon by Mirtich [2]. The idea of impulse-based dynamic simulation is to treat all contact between bodies by a series of collisions that are modelled as accurately as reasonably possible. Unsurprisingly, this paradigm works very well for systems which exhibit rapid high frequency collisions e.g. a lottery machine or a part feeder. However, even for continuous contact the paradigm still allows for fast and efficient computation [2].

We shall prove that for any sequence of numerical solutions  $(q_\epsilon, v_\epsilon)$  depending on the numerical non-interpenetration threshold  $\epsilon$  there exists a subsequence that converges to an appropriately defined generalised solution of the equations of motion.

## References

- [1] J. K. Hahn. Realistic animation of rigid bodies. *Computer Graphics*, 22(4):299-308, 1988.
- [2] B. V. Mirtich. *Impulse-based Dynamic Simulation of Rigid Body Systems*. PhD thesis, University of California at Berkeley, 1996.