MPP DECOMPOSITION OF A SPH MODEL

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ABSTRACT

SPH, Smoothed Particle Hydrodynamics, is a very efficient tool to model industrial problems where large deformations occur. However, one disadvantage of the SPH technique is the expensive cpu cost compared to standard Finite Elements. Using the MPP version of LS-DYNA allows users to handle large problems (more than a million of particles) in a reasonable time.

Due to the meshfree nature of the SPH method, standard decompositions used for finite elements can sometimes lead to very bad speed-up of the code. Users have to be aware of some options and rules to define customized decompositions in order to minimize communications between processors and get very good load balancing. Two different models are presented. The first one is a pure SPH model of a high velocity impact of a sphere on a plate, the second one is a coupled FE-SPH model of a bird impacting a set of fan blades of an engine.

KEYWORDS:

SPH, MPP decomposition