

A MESHLESS APPROACH FOR METAL FORMING STRUCTURAL ANALYSES

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Smoothed Particle Hydrodynamics (SPH) is a meshless computational method able to perform an integral representation of a function by means of a smoothing kernel function by involving a finite particle distribution in the discrete formulation. In the broad landscape of meshless methods, SPH is one of few techniques which can be really named as “truly meshless”, in fact it uses any mesh for both field variable approximation and integration. Finally it is computationally efficient, very simple to implement and guarantees the same or better accuracy obtained by a FEM method [1], in particular as complex problems characterized by strong gradients of the field variables are considered. In this work the use of Smoothed Particle Hydrodynamics method is presented in the Mechanical Engineering Structural Analyses framework. In particular a metal forming plastic nonlinear problem is described and solved [2].

References

- [1] G. Di Blasi, A. Tortorici, E. Toscano *On the Use of SPH for Mechanical Engineering Structural Analyses: An Elastic Linear Case*, Submitted to Computer Methods in Applied Mechanics and Engineering (Feb. 2011).
- [2] J. Bonet, S. Kulasegaram *Correction and Stabilization of Smooth Particle Hydrodynamics Methods with Applications in Metal Forming Simulations*, International Journal for Numerical Methods in Engineering, 47 (2000), pp. 1189–1214.