

**Tsuji, P.; Puso, M.; Spangler, C. W.; Owen, J. M.; Goto, D.; Orzechowski, T.**  
**Embedded smoothed particle hydrodynamics.** (English) [Zbl 1442.74240](#)  
*Comput. Methods Appl. Mech. Eng.* 366, Article ID 113003, 15 p. (2020).

**Summary:** In this paper, a hybrid method for embedding a meshfree smoothed particle hydrodynamics into mesh-based ALE hydro schemes is presented. The method relies on the embedded mesh framework presented in [the second author et al., *Int. J. Numer. Methods Eng.* 104, No. 7, 697–720 (2015; [Zbl 1354.65195](#)); *Comput. Methods Appl. Mech. Eng.* 245–246, 273–289 (2012; [Zbl 1354.74294](#))] and utilizes SPH [*J. Owen*, “ASPH modeling of material damage and failure”, in: *Proceedings of the 5th international SPHERIC SPH workshop*, Manchester, U.K., June 23–25, 2010. Manchester: University of Manchester. 297–304 (2010)]. in the solid foreground; when an appropriate damage or failure model is used with SPH, it becomes a natural way to model material fracture and cracking in high-explosive driven experiments. We provide various examples which validate the coupling between SPH and the embedded mesh method.

**MSC:**

- 74S05 Finite element methods applied to problems in solid mechanics
- 74S60 Stochastic and other probabilistic methods applied to problems in solid mechanics
- 65M60 Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs
- 65M75 Probabilistic methods, particle methods, etc. for initial value and initial-boundary value problems involving PDEs
- 76M28 Particle methods and lattice-gas methods

**Keywords:**

mortar contact; domain decomposition; Lagrange multipliers; localized Lagrange multipliers; meshfree methods; material fracture

**Software:**

ABAQUS; DYNA3D; LS-DYNA; TREESPH

**Full Text:** [DOI](#)

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