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MS-22

Advances in Material Point Methods: Accuracy, Efficiency and Benchmarking

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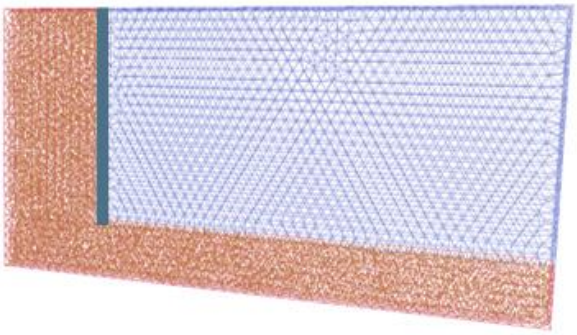
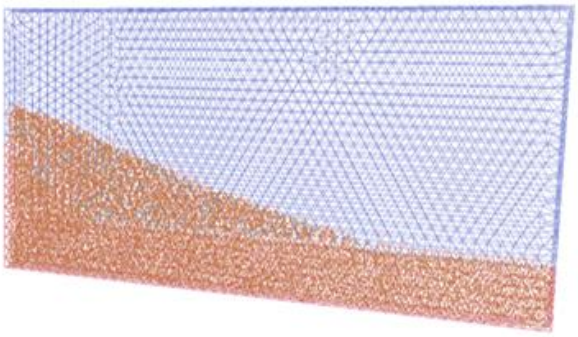
In recent years, a number of alternatives to standard finite element methods (FEM) have been proposed for the solution of engineering problems in continuum mechanics, particularly those involving very large deformations. The material-point method (MPM) is a hybrid method that uses Lagrangian material points that move freely through the problem domain relative to a background mesh. These points carry information about the solution and depict the geometry, while interactions between these points are computed by projecting information to a background mesh and solving equations of motion on that mesh. Thus, the method preserves the meshfree description of the continuum while still utilizing efficiencies of mesh-based solution strategies.





There is increasing interest in the MPM (and its variants, such as GIMP, CPDI1, CPDI2, etc.) as a means of modelling 2D and 3D continuum problems in which very large deformations occur, e.g. in the study of landslides and metal forming; or in which the geometry is complicated to mesh, e.g. in the study of porous media or polycrystals. **The purpose of this minisymposium is to provide a forum for presenting advances in the method both developers and practitioners**, e.g. improving the ***accuracy*** of MPMs (including convergence and benchmark problems), dealing with ***numerical issues***, modelling of ***coupled problems***, computational ***efficiency*** and ***applications to real world problems***.

Topics of Interest Include:

- Material point methods
- Large deformation continuum analysis
- Accuracy, convergence and benchmarking
- Analysis of coupled problems

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Abstract submission: *https://sites.durham.ac.uk/emi2020-ic/abstracts-submission/*