Abstract Submitted
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Coupling the Finite Volume Particle Method with the Finite Element Method for fluid-structure interaction for large deformations[1]
MARYROSE MCLOONE, NATHAN QUINLAN, NUI Galway — The finite volume particle method (FVPM) is a meshless CFD method. FVPM is advantageous for fluid-structure interaction (FSI) as walls are defined as exact geometry, therefore fictitious particles are not required for wall modelling, saving on computational cost. To date, FVPM has not been coupled with an external solid solver for two-way FSI. FVPM is here coupled with a mesh-based finite element solid mechanics solver, FEBio (Maas et al., 2012), for 2D FSI. This allows for the modelling of highly deformable solids. The FSI method is applied to the elastic dambreak case of Antoci et al. (2007). The method is validated by comparing the gate displacement against the experiment. The FSI-computed gate displacement agrees well with the experimental data. Antoci, C, Gallati, M, & Sibilla, S, (2007). Numerical simulation of fluid–structure interaction by SPH. Computers & Structures, 85(11-14), 879-890. Maas, S. A, Ellis, B. J, Ateshian, G. A, & Weiss, J. A, (2012). FEBio: finite elements for biomechanics. Journal of biomechanical engineering, 134(1).

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