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Multi-Implicit Blob Projection Method LAUREN FOVARGUE, Rensselaer Polytechnic Institute — Many problems in biological fluid-structure interaction have been studied with C. S. Peskin's immersed boundary method (IBM). This method defines a relatively simple mathematical modeling framework, and allows for the use of standard fluid solvers. Often, when this is evaluated computationally in many applications, a very small time step is required. This time step is not restricted by accuracy, but stability, causing the temporal problem to be stiff. Previous attempts to address the stability restriction of IBM use semi or fully implicit schemes that require the code, including the fluid solver, to be rewritten, and these have yet to be implemented in application focused studies. Here, new ideas for addressing the computational cost of IBM are presented, which rely on a novel method for splitting the spatial field into stiff and non-stiff components. With this splitting, the impact on the largest stable time step and computational cost for stiff problems is investigated through a multi-implicit technique, which focuses on the treatment of the immersed boundary, where no changes to the fluid solver are necessary.

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