Abstract Submitted
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**Full Eulerian finite difference computation for fluid-structure coupling problem**[1] KAZUYASU SUGIYAMA, SHINTARO TAKEUCHI, SATOSHI II, The Univ. of Tokyo, SHU TAKAGI, Riken, YOICHIRO MATSUMOTO, The Univ. of Tokyo — A new simulation method for solving fluid-structure coupling problems has been developed. An efficient and robust numerical algorithm is achieved by extending standard incompressible fluid flow solvers based on a full Eulerian formulation. All the basic equations are numerically solved on a fixed Cartesian grid in a finite difference scheme. A volume-of-fluid approach, which has been developed for computing multiphase flows, is applied to describing the multi-component geometry. The temporal change in the solid deformation is described on the Eulerian frame by updating a left Cauchy-Green deformation tensor, which represents constitutive equations for the Cauchy stress of hyperelastic materials such as Mooney-Rivin and St. Venant- Kirchhoff ones. The present simulation method is validated by showing good agreement with available numerical data (Zhao *et al.* (2008) J. Comput. Phys. **227**, 3114), and by demonstrating reversibility in shape of the hyperelastic material.

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