

Efficient Approach for the Fluid-Structure Interaction Problems and the Comparison between Experiment and Computation

*†Y. Nakabayashi¹, *S. Nagaoka², Y. Tamura¹ and G. Yagawa²

¹Department of Information Sciences and Arts, Toyo University, Japan

²Center for Computational Mechanics Research, Toyo University, Japan

*Presenting author: nakabayashi@toyo.jp

†Corresponding author: nakabayashi@toyo.jp

Abstract

Both the SUPG/PSPG stabilized finite element method for the flow analysis and the enriched free mesh method (EFMM) for the solid analysis use the same type element, the linear triangle elements for 2D problems and the linear tetrahedral elements for 3D problems. Therefore, the handling of the fluid-structure interface becomes simple and accurate. On the other hand, the EFMM is not suitable for parallel computing because the domain decomposition is difficult for the EFMM data structure. In this study, we proposed the new approach for the parallelizing the EFMM and show some numerical examples of fluid-structure interaction problems.

Furthermore, the authors compared the computational results with the experimental results for validation and verification.

Keywords: FSI, SUPG/PSPG Stabilized FEM, Enriched Free Mesh Method

References

Yagawa, G. and Matsubara, H., “Enriched element method and its applications to solid mechanics”, *Proc. Computational Method In Engineering and Science EPMESC X*, pp. 15-18, 2006.

S. Nagaoka, Y. Nakagabashi and G. Yagawa, Accurate fluid-structure interaction computations using elements without midside nodes. *Comput Mech.*, Vol. **48**, pp. 269-276, 2011.