APCOM & ISCM
11-14th December, 2013, Singapore

Development of a Pressure-Stabilized Characteristics Finite Element Scheme for Flow Problems with Moving Domains

***Hirofumi Notsu[1]**

[1]Waseda Institute for Advanced Study, Waseda University, 3-4-1, Okubo, Shinjuku-ku, Tokyo, Japan

*Corresponding author: h.notsu@aoni.waseda.jp

We study finite element schemes based on the method of characteristics, which have an advantage that the resulting matrices are symmetric. Recently we have presented a pressure-stabilized characteristics finite element scheme for the Navier-Stokes problems with fixed domains. It employs a cheap element P1/P1 and yields easy three-dimensional computations. The stability and error estimates of the scheme have been mathematically proved. Here we apply the scheme to flow problems with moving domains. In order to overcome the difficulty of the moving domains we introduce an internal iterative technique. The symmetry of the matrices is maintained in the iterative technique. We present the characteristics finite element scheme and its numerical results.

Keywords: The method of characteristics, The finite element method, Moving domains, Pressure-stabilization