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Response of the Free Surface of an Electrically Conducting Liquid to a Magnetic Field SURESH MURUGAIYAN, COLIN ADAMS, BHUVANA SRINIVASAN, STEFANO BRIZZOLARA, Kevin T. Crofton Department of Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University — Response of the free surface of an electrically conducting liquid to a magnetic field that varies in space and time, is studied using numerical simulations. A fully implicit finite volume solver is used to solve magnetohydrodynamic equations. The equations are solved using a segregated approach on a collocated grid arrangement where all the variables are stored at the cell centers. The PISO (Pressure-Implicit with Splitting of Operators) algorithm is used to solve the equation of fluid momentum with the Rhie and Chow momentum interpolation technique to overcome oscillations in pressure. The equation of magnetic field evolution is solved in the same manner as the equation of fluid momentum by introducing an artificial pressure term. The method of Volume Of Fluid (VOF) is used to track the interface between the two immiscible fluids. Numerical experiments concerning the effect of high density ratio on a two-fluid magnetohydrodynamic system shall be carried out.

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