Boundary-Domain Integral Equation Systems to the Mixed BVP for Compressible Stokes Equations with Variable Viscosity in 2D

Mulugeta Dagnaw[1] and Tsegaye Ayele[2]

[1]Addis Ababa University College of Natural Sciences
[2]Addis Ababa University

May 5, 2020

Abstract

In this paper, the Boundary-Domain Integral Equations (BDIEs) for the mixed boundary value problem(BVP) for a compressible Stokes system of partial differential equation (PDE) with variable coefficient in 2D is considered . An appropriate parametrix is used to reduce this BVP to the BDIEs. Although the theory of BDIEs in 3D is well developed, the BDIEs in 2D need a special consideration due to their different equivalence properties. As a result, we need to set conditions on the domain or on the spaces to ensure the invertibility of corresponding parametrix-based integral layer potentials and hence the unique solvability of BDIEs. The properties of corresponding potential operators are investigated. Equivalence of the BDIE systems to the mixed BVP and invertibility of the matrix operators associated with the BDIE systems in appropriate Sobolev spaces are proved.

Hosted file

Mixed BDIE systems for compressible stokes Equations.pdf available at https://authorea.com/users/292922/articles/424341-boundary-domain-integral-equation-systems-to-the-mixed-bvp-for-compressible-stokes-equations-with-variable-viscosity-in-2d