



Karlstad Applied Analysis Seminar (2022)

Tsegaye Gedif Ayele , University of Addis Ababa, Ethiopia.

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Analysis of Boundary-Domain Integral Equations for Variable-Coefficient Mixed BVP in 2D

Abstract

The direct segregated Boundary-Domain Integral Equations (BDIEs) for the mixed boundary value problem for a second order elliptic partial differential equation with variable coefficient in 2D is considered in this talk. An appropriate parametrix (Levi function) 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 associated Sobolev spaces to insure the invertibility of corresponding parametrix-based integral layer potentials and hence the unique solvability of BDIEs. The properties of corresponding potential operators are investigated. The equivalence of the original BVP and the obtained BDIEs is analysed and the invertibility of the BDIE operators is proved. (A joint work with Dufera T. T. and Mikhailov S. E.)