Two operator Boundary-Domain Integral Equations for variable coefficient Mixed BVP in 2D

Tsegaye Ayele[1] and Solomon BEKELE[1]

[1]Addis Ababa University

May 5, 2020

Abstract

The formulation and analysis of two operator Boundary-Domain Integral Equation systems for variable coefficient mixed BVP with in two dimensional domain is discussed. To analyse the two-operator approach, we applied one of its linear versions to the mixed (Dirichlet-Neumann) BVP for a linear second-order scalar elliptic variable-coefficient PDE and reduced it to four different BDIE systems. %The two-operator BDIE systems are nonstandard systems of equations containing integral operators defined on the domain under consideration and potential type and pseudo-differential operators defined on open sub-manifolds of the boundary. Using the results as in CMN09 and AM11, a rigorous analysis of the two-operator BDIE systems is given and it is shown that they are equivalent to the mixed BVP and thus are uniquely solvable, while the corresponding boundary domain integral operators are invertible in the appropriate Sobolev-Slobodetski (Bessel potential) spaces.

Hosted file

`solomonmixed.pdf` available at https://authorea.com/users/292921/articles/424342-two-operator-boundary-domain-integral-equations-for-variable-coefficient-mixed-bvp-in-2d