ABSTRACT

THESIS: Numerical Multigrid algorithm for solving Integral Equations.

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Integral equations arise in many scientific and engineering problems. A large class of initial and boundary value problems can be converted to Volterra or Fredholm integral equations. The potential theory contributed more than any field to give rise to integral equations. Integral equations also has significant application in mathematical physics models, such as diffraction problems, scattering in quantum mechanics, conformal mapping and water waves. The Volterra's population growth model, biological species living together, propagation of stocked fish in a new lake, the heat transfer and the heat radiation are among many areas that are described by integral equations. For limited applicability of analytical techniques, the numerical solvers often are the only viable alternative. General computational techniques of solving integral equation involve discretization and generates equivalent system of linear equations. In most of the cases the discretization produces dense matrix. Multigrid methods are widely used to solve partial differential equation. We discuss the multigrid algorithms to solve integral equations and propose usages of distributive relaxation and the Kaczmarz method.