On the Numerical Solution of a Elliptic Problem with Nonlocal Boundary Condition

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Abstract

We study the convergence of a finite difference scheme that approximates system of elliptic equations with variable coefficients. As a model example it is taken an area consisting of two separate unit squares. In each subarea was given a boundary problem of elliptic type, where the interaction between their solutions is described by nonlocal integral conjugation conditions. We assume that the generalized solution of the problem belongs to the Sobolev space H^s, $2 < s \leq 3$. An estimate of the convergence rate, compatible with the smoothness of the input data is obtained. Also, we consider the case when the coerciveness assumption is not met.

Keywords: elliptic equation, nonlocal integral conjugation conditions, finite difference scheme, convergence rate LaTeX

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