Iterative Method for Solving Strongly Mixed Boundary Value Problems for Biharmonic Equations

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Abstract: In previous works we developed an iterative method for solving boundary value problems (BVPs) for biharmonic and biharmonic type equations with some types of conditions given on the whole boundary. The method is based on iterative scheme for the operator equation to which BVP is reduced. In this paper we continue to develop the method for some strongly mixed BVPs for biharmonic equation with complicated boundary conditions, which are of different types on different sides of a rectangle and the transmission of boundary conditions occurs not only in vertices but also in an inner point of a side of the rectangle. Such mixed problems arise in fracture mechanics, hydromechanics and nanofluidic physics. We reduce these problems to sequences of strongly mixed problems for Poisson equation, and for the later ones we apply a decomposition method recently developed by ourselves. The convergence of the proposed iterative method is proved theoretically and numerical experiments show the efficiency of the method.

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