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**h-, p-, and hp-versions of the least-squares collocation method for solving boundary value problems for biharmonic equation in irregular domains and their applications.** (English. Russian original) Zbl 07538076


Summary: New h-, p-, and hp-versions of the least-squares collocation method are proposed and implemented. They yield approximate solutions of boundary value problems for an inhomogeneous biharmonic equation in irregular and multiply-connected domains. Formulas for the extension operation in the transition from coarse to finer grids on a multigrid complex are given in the case of applying various spaces of polynomials. It is experimentally shown that numerical solutions of boundary value problems produced by the developed versions of the method have a higher order of convergence to analytical solutions with no singularities. The results are compared with those of other authors produced by applying finite difference, finite element, and other methods based on Chebyshev polynomials. Examples of problems with singularities are considered. The developed versions of the method are used to simulate the bending of an elastic isotropic plate of irregular shape subjected to transverse loading.

**MSC:**
- 65-XX Numerical analysis
- 74-XX Mechanics of deformable solids

**Keywords:**
- biharmonic equation; irregular multiply-connected domain; boundary value problem; least-squares collocation method; higher order of convergence; bending of isotropic plate

**Full Text:** DOI

**References:**


