Mikhailov, S. E.

Localized direct boundary-domain integro-differential formulations for scalar nonlinear boundary-value problems with variable coefficients. (English) Zbl 1073.65136

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Summary: Mixed boundary-value problems (BVPs) for a second-order quasi-linear elliptic partial differential equation with variable coefficients dependent on the unknown solution and its gradient are considered. Localized parametrices of auxiliary linear partial differential equations along with different combinations of the Green identities for the original and auxiliary equations are used to reduce the BVPs to direct or two-operator direct quasi-linear localized boundary-domain integro-differential equations (LBDIDEs). Different parametrix localizations are discussed, and the corresponding nonlinear LBDIDEs are presented. Mesh-based and mesh-less algorithms for the LBDIDE discretization are described that reduce the LBDIDEs to sparse systems of quasi-linear algebraic equations.

MSC:

65N38	Boundary element methods for boundary value problems involving PDEs	Cited in **1** Review Cited in **12** Documents
35J65	Nonlinear boundary value problems for linear elliptic equations	
65H10	Numerical computation of solutions to systems of equations	

Keywords:

heat transfer; mesh-based and mesh-less algorithms; second-order quasi-linear elliptic equation; quasi-linear localized boundary-domain integro-differential equations; parametrix localizations; sparse systems

Software:

BEMECH

Full Text: DOI Link

References:

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