Approximate Solution of Boundary Value Problems for the Ordinary Second-Order Differential Equation with Variable Coefficients

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New computing algorithms for approximate solution of the two-point boundary value problem with variable coefficient are described in the paper. Green function of the given boundary value problem considered as a non-linear operator with respect to the variable coefficient is approximated by means of operator interpolation polynomial of the Newton type. For approximation of the inverse operator two different types of formulae are constructed. Conventionally these formulas can be called direct and modified formulas. Consequently, for approximate solution of the two-point boundary value problem with variable coefficients direct and modified interpolation operator methods are used. Description of the algorithms for approximate solution are provided and the computation results of the test problems are given in tables (see [1], [2]).

References:

[1] A.Papukashvili. Approximate Solution of Boundary Value Problem for the Ordinary Second-Order Differential Equation with Variable Coefficients by Means of Operator Interpolation Method. Bulletin of the Georgian National Academy of Sciences, vol. 10, no. 3, 2016. p. 7-16.

[2] A. Papukashvili, B. Tezelishvili, Z. Vashakidze. The numerical solution of a two-point boundary value problem with a non-constant coefficient by means of operator interpolation method. Reports of Enlarged Session of the Seminar of I. Vekua Institute of Applied Mathematics. Volume 30, 2016. 4 p.