TWO-SIDED EXTRAPOLATION METHOD FOR INCREASING THE ACCURACY OF NUMERICAL SOLUTIONS

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The Richardson extrapolation to the limit is a common way of increasing the accuracy of finite difference and finite element solutions. In this paper practical method for estimating of the order of convergence and nonlinear extrapolation formula for increasing the accuracy of numerical solutions for three meshes are considered. Use this formula and simple linear Richardson extrapolation formula simultaneously gives two-sided bounds of the exact solution. In special case where the mesh sizes form a geometric progression, suggested nonlinear extrapolation formula is famous Aitken's process.

A number of examples of increasing the accuracy of difference and finite element solutions are considered. In particular dynamic stability analysis (divergence and flutter) of tapered columns subjected to distributed follower forces, problems of stability and vibrations of beams and rectangular plates by finite element method.

The proposed two-sided method is found to be computationally efficient and simple to implement.

REFERENCES

[1] G.I. Marchuk and V.V. Shaidurov. *Difference methods and their extrapolations*. Springer-Verlag, New York, 1983.