

A least square extrapolation method for heat transfer

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A posteriori error estimators are powerful tools to improve the reliability of numerical computations. The main error estimator's theories have been widely developed in the finite element framework, mostly for linear operators and in the absence of disparate scales. On the other hand, mesh refinement combined with Richardson extrapolation (RE) is most popular in the CFD community because of its simplicity and somehow intuitive approach. It has been applied to a very broad spectrum of complex flow situations, but its validity and robustness is questionable. We have developed in a series of papers a Least Square Extrapolation method (LSE) first introduced in [1] and [2], that provides a convenient framework to improve RE. LSE makes use of the PDE discretization information, rather than an a priori Taylor expansion like's model of the error. So far we have shown that LSE can outperform traditional RE for steady elliptic problem and steady Navier Stokes incompressible flow. In this paper we will focus on the application of LSE method to unsteady nonlinear heat transfer problem.

References

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