A Residual based a Posteriori Error Estimators for Algebraic Flux Correction Scheme

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Non-linear discretizations are necessary for convection-diffusion-reaction equations for obtaining accurate solutions that satisfy the discrete maximum principle (DMP). Algebraic stabilizations, also known as Algebraic Flux Correction (AFC) schemes, belong to the very few finite element discretizations that satisfy this property. Results regarding the convergence of the scheme [BJK16] and efficient solution of the nonlinear system of equations [JJ19] have been obtained recently.

The talk is devoted to the proposal of a new residual-based a posteriori error estimator for AFC schemes. We derive a global upper bound in the energy norm of the system which is independent of the choice of the limiter in the AFC scheme. We also derive a global upper bound by combining the estimators from [JN13] and the AFC schemes. Numerical simulations in 2d are presented which support the analytical findings.

References:

[1] https://epubs.siam.org/doi/abs/10.1137/15M1018216

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