

INSALATE DI MATEMATICA

presents

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A quasi-Trefftz discontinuous Galerkin method for the diffusion-advection-reaction equation with piecewise-smooth coefficients



Abstract:

Trefftz schemes are high-order Galerkin methods whose discrete functions are elementwise exact solutions of the underlying PDE. When the equation has varying coefficients, exact solutions are generally unavailable, making the construction of discrete Trefftz spaces impossible. To overcome this limitation, quasi-Trefftz methods rely on elementwise “approximate solutions” of the PDE. The main advantage of these schemes over more classical ones is the higher accuracy for comparable numbers of degrees of freedom. In this talk, we will describe a polynomial quasi-Trefftz space, its optimal approximation properties and provide a simple algorithm to compute the discrete functions. We will focus on a quasi-Trefftz DG method for the diffusion-advection-reaction equation, showing stability, high-order convergence and some numerical experiments.

Keywords: quasi-Trefftz method · DG method · diffusion-advection-reaction equation

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“Obvious” is the most dangerous word in mathematics.
(Eric Temple Bell)