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"Formulação de Mínimos Quadrados Aplicada a Problemas de Advecção-Difusão"

In this work we apply a finite element least-square formulation to a stealy state advection-diffusion and advection problems.In advection-diffusion problem the original equations are rewriten as a first order equivalent system reducing, in this way, the extra regularity of the interpolations functions as it occurs to the classical approach of this formulation. Besides of working with a mixed formulation as we do here, one has a minimization problem that does not require compatibility between the approximation spaces.

Convergence rates for advection-diffusion and purely advective problems are presented,

Numerical results show good agreement with the convergence rates obtained by the analysis with different boundary conditions, examples are presented and compared with results obtained for others formulations.

For the transient problem one uses a discontinous space-time finite element formulation linear in space and constant in time, and some numerical results are presented and compared with semi-discrete least-squares formulation.