

Discontinuous Galerkin Methods for Evolutionary Equations

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We consider evolutionary problems of the form

$$(\partial_t M_0 + M_1 + A) u = f$$

on a Hilbert space H . Here, ∂_t denotes the derivative with respect to time, introduced as a normal continuously invertible operator in a suitable L_2 -space, M_0, M_1 are bounded operators on H and A is a skew-selfadjoint, possibly unbounded operator on H . By the solution theory developed by R. Picard, the problem above is well-posed in the sense of Hadamard. We discretise the above problem in time by a discontinuous Galerkin method and show convergence of the solutions of the discretised problems to the solution of the original one. In examples, we illustrate how the techniques can be applied to partial differential equations of mixed type without imposing transmission conditions. This is a joint work with S. Franz (TU Dresden) and M. Waurick (University of Bath).