Hp-adaptivity in higher space-dimensions

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Nowadays a posteriori error estimation is an expected and assessed feature in scientific computing. It is used for adaptively creating approximation spaces and to assess the accuracy of numerical solutions. The performance of the finite element method can be improved by mesh refinement (h-FEM) or the use of higher oder ansatz spaces (p-FEM). Taking a combination of both (hp-FEM) can lead to exponentially fast convergence with respect to the number of degrees of freedom. For the h-FEM adaptive mesh creation is widely discussed in literature. For the p- and hp-FEM there have been proposed several strategies for adaptively creating problem-dependent meshes. In [1] an hp-adaptive refinement strategy, which is based on the solution of local boundary value problems, was proposed and also its convergence was shown.
In this talk we present this refinement strategy shortly. Further we show first results of the application of this adaptive strategy to problems with boundary layers.

References:

[1] M. Bürg and W. Dörfler, *Convergence of an adaptive* hp *finite element strategy in higher space-dimensions*, submitted

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