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joint work with

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CONVERGENCE OF ADAPTIVE DISCONTINUOUS GALERKIN METHODS

Consulting the unprecedented developments of convergence and optimality theory of conforming adaptive finite element methods during the last two decades, the strict Dörfler marking and the resulting reduction of some error quantity appears to be fundamental for most of the results. A straightforward generalisation to discontinuous Galerkin (dG) methods is difficult due to the fact that the penalty term is not necessarily monotone. However, for large enough penalty parameters Karakashian and Pascal (2007) proved error reduction and Bonito and Nochetto (2010) proved optimality for the adaptive symmetric interior penalty method with Dörfler marking.

In contrast to these results, in this talk, we generalise the basic convergence analysis by Morin, Siebert, and Veiser (2008) for adaptive discontinuous Galerkin methods. On the one hand, this provides convergence without rates. On the other hand the theory covers different dG schemes as well as all practically relevant marking strategies. Another key feature of the presented result is, that it does not require an extra enlargement of the penalty parameter. The analysis is based on a quasi interpolation into a newly developed limit space of the adaptively created non-conforming discrete spaces.