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ON A MIXED DISCONTINUOUS GALERKIN METHOD*

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Abstract. For the model Poisson problem we study the stabilized Bassi-Rebay discontinuous Galerkin method. The method is written in a mixed formulation, in which independent and fully discontinuous basis functions are used both for the scalar unknown and its flux. The continuity requirement is imposed by Nitsche's technique [Abh. Math. Sem. Univ. Hamburg, 36 (1970/71), pp. 9–15]. In the implementation the flux is then eliminated by local condensing. We show that the method is stable and optimally convergent for all positive values of the stability parameter. We also perform an a posteriori error analysis. The theoretical results are verified by numerical computations.

Key words. mixed method, discontinuous Galerkin method, stability, Nitsche's method

AMS subject classifications. 65N30, 65N55

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