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DPG analysis: adjoint problems and test norms *

Norbert Heuer[†] Michael Karkulik[‡]

Abstract

Standard analysis of the discontinuous Petrov-Galerkin method (DPG) with optimal test functions is based on a direct relationship between trial and test spaces, and their norms. Depending on the particular problem under consideration, theoretical and practical requirements imply different conditions both for the selection of spaces and for the definition of norms. Key ingredient is a regularity analysis of the adjoint problem. For an appropriate selection of norms, it is well posed. In this talk, we discuss several examples (like convection-dominated diffusion, non-conforming trace approximation, hypersingular boundary integral operators, and a coupled PDE-boundary integral operators scheme) and show how problem-dependent objectives force the selection of spaces and norms.

Key words: discontinuous Petrov-Galerkin method with optimal test functions, regularity analysis, adjoint problem

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[†]Facultad de Matemáticas, Pontificia Universidad Católica de Chile, Avda. Vicuña Mackenna 4860, Santiago, Chile, email: nheuer@mat.puc.cl

[‡]Facultad de Matemáticas, Pontificia Universidad Católica de Chile, Avda. Vicuña Mackenna 4860, Santiago, Chile, email: mkarkulik@mat.puc.cl