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A Coupling of Local Discontinuous Galerkin and Natural Boundary Element

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Summary

In this paper, we apply the coupling of local discontinuous Galerkin(LDG) and natural boundary element (NBE) methods to solve a class of exterior transmission problems in the plane. As a consequence, the main features of LDG and NBEM are maintained and hence the coupled approach benefits from the advantages of both methods. Referring to \cite{Gatica2010}, we employ LDG subspaces whose functions are continuous on the coupling boundary. The continuity can be implemented either directly. In this way, the normal derivative becomes the only boundary unknown, and hence the total number of unknown functions is reduced by two. We prove the stability of the new discrete scheme and derive an a priori error estimate in the energy norm. A numerical example conforming the theoretical result is provided.