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# An update of the DPG method for wave propagation problems*

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**Abstract**

The discontinuous Petrov-Galerkin (DPG) method has shown outstanding numerical results for high frequency wave propagation and other singular perturbation problems [3, 2]. Indeed, for acoustic waves, we find that the method exhibits negligible phase errors (otherwise known as pollution errors) even in the lowest order case. This is despite the negative result of Babuška & Sauter [1] predicting that in two dimensions, it is impossible to eliminate the pollution effect completely. Theoretically, we are able to prove error estimates that explicitly show the dependencies with respect to the wavenumber $\omega$, the mesh size $h$, and the polynomial degree $p$. But the current state of the theory does not fully explain the remarkably good numerical phase errors. In this talk, we give an update of the state of the art of our research in this subject.

**Key words**: discontinuous Petrov Galerkin, Helmholtz equation, phase error

## References

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