

## A Partition of Unity Finite Element Method for acoustic wave propagation problems in layered media

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### Abstract:

Among the methods which mitigate the numerical pollution, the Partition of the Unity Finite Element Method (introduced by Babūška and Ihlenburg in 1995 [1]) has been used recently to deal with the time-harmonic wave propagation in stratified fluid (see [2]). The FEM discretization space is modified by enriching the basis functions with plane waves, and so inserting free-space solutions of the homogeneous model into the standard local polynomial basis. To guarantee the continuity of the approximated solution, Lagrange multipliers are used to enforce the coupling conditions on the boundary between media of different nature.

In this work, the time-harmonic acoustic model is numerically solved by means of a PUFEM method which uses a new enrichment procedure. Instead of using simple plane wave solutions of a constant-coefficient partial differential equation, the proposed method is based on local solutions of the variable coefficient model. Some numerical experiments are carried out to illustrate the performance of this PUFEM procedure.

### References:

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