Complex topography and media implementation using hp-adaptive DG-FEM for seismic wave modeling

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Numerical simulation of seismic wavefield is helpful to understand the propagation law of seismic wave in complex media. In addition, accurate simulation of seismic wave propagation is of great importance for seismic inversion. The discontinuous Galerkin finite element method (DG-FEM) combines the advantages of finite element method (FEM) and finite volume method (FVM) to effectively simulate the propagation characteristics of seismic waves in complex medium.

In this study, we use the hp-adaptive DG-FEM to perform accurate simulation of seismic wave propagation in complex topography and medium, and compare the results with the analytical solution of the Generalized Reflection/Transmission (GRT) coefficient method. Furthermore, ADE CFS-PML is modified and applied to DG-FEM, which greatly reduces the impact of artificial boundaries.