Second-order seismic wave equations with the implementation of the nearly perfectly matched layer

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Seismic modeling plays an important role in helping us better understand seismic wave characterization in the interior of the earth. While working on numerical simulation of seismic wave propagation, unwanted artificial reflections which are reflected from the truncated boundaries should be strongly suppressed by absorbing boundary conditions since they may disturb the seismic records. Different from finite difference solution for discrete model based on first-order wave equations, second-order seismic wave equations with nearly perfectly matched layer (NPML) are reviewed here from pure acoustic wave to elastic anisotropic wave media. Snapshots and seismograms obtained at receivers in several models are used to check the validity of the NPML. Moreover, we also apply reverse time migration technique to image geological structure in five-layer model. The migration results indicate that the performance of NPML is working powerfully.

Biography
Jingyi Chen holds Decker Dawson Assistant Professor of Geophysics at The University of Tulsa. He received Ph.D. in solid geophysics from Institute of Geology and Geophysics, Chinese Academy of Sciences (IGGCAS) in 2005, Beijing, China. His research interests focus on microseismic and rock physics in unconventional resources (shale/tight gas), numerical simulation of seismic wave propagation, and seismic reverse time migration (RTM) and inversion.

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