Formulation of computation of highly accurate synthetic seismograms for a point source between numerical grids

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Introducing a point source in computation of synthetic seismograms is imposing the discontinuous boundary conditions for displacement and traction there. It is straightforward to impose such discontinuous condition for a point source on a numerical grid, however, if a point source is not on a numerical grid, some tricks are required to impose such discontinuous conditions accurately. We previously derived a weak form (i.e. Direct Solution Method) solution for an arbitrary point force by applying the source representation of Geller & Hatori (1995, GJI). In this study, we extend this method to other discretization methods such as the time domain finite difference method and pseudo-spectrum method.