Seismic scattering for a point scatterer -With a special interest to the application in Exploration Geophysics-

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Seismic scattering is key phenomena to deal with seismic survey data using reflection, diffraction caused by the inhomogeneities in a medium where seismic waves travel through. Scattered seismic waves are in general exploited using the first order Born or Rylov approximation to inhomogeneous Helmholtz equation to weak inhomogeneites or contrasts in elastic parameters, i.e., two Lame's constants and density, that could have distribution to break the assumption of weak contrast in practice. When the order of such inhomogeneities increases, only a spherical inclusion of inhomogeneities has been studied although a point scatterer is preferred to treat seismic scatterers as point scatterers to satisfy the wave equation including virtual seismic sources in our conventional seismic surveys In this study, an elastic scattering theory is presented to express scattered seismic waves generated by a point scatterer to incident both compressional and shear waves. We first obtained a small spherical inclusion of inhomogeneities in a uniform medium and then take the smallest limit of the diameter of the inclusion. Our results show that the scattered waves are similar to what has been obtained for a weak contract case but differs in terms of the combination of elastic parameters. Based on our results, we may use the solution of our scattering equation directly in the inhomogeneous wave equation as a scattering Green's function.

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