

## **Models for Scattering of Surface Waves from Scratches on a Surface**

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### **Abstract**

Multiple scattering of surface waves from parallel scratches at the surface of a half-space is studied in this paper. A model for scattering of surface waves by a single defect introduced in the previous work is used for multiple scattering analysis. The scattered field is shown to be equivalent to the total radiation from the distributions of tractions, calculated from the incident wave, over the surfaces of the scratches. The second order approximation to multiple scattering problem is considered to derive an explicit set of equations which approximate the scattered field. The vertical displacement at some distance from the scratches is calculated and verified by the solution of the same problem obtained by the boundary element method (BEM). The analytical and BEM results are graphically displayed and show good agreement when the depths of the scratches are small compared to the wavelength. The limitations of the approximate approach are considered based on the comparisons with the BEM results.

**Key Words:** Surface waves, Half-space, Multiple scattering, Parallel scratches, Self-consistent method, BEM.