

Simulation of Earthquake Motions Based on Inversion of Phase Spectrum

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Modeling phase characteristics of earthquake ground motion is important to synthesizing a design earthquake motion consistent with the given response spectra. We assume that an earthquake ground motion can be expressed by the convolution of the three time functions: source, path and site effect functions. This paper presents a new methodology to model phase characteristics of earthquake motion by using the concept of group delay time. The group delay time of the source effects, which are caused by rupture propagation on the fault plane, are theoretically calculated. The group delay times of the path and site effect are empirically modeled from observed records using inversion technique. We, also, demonstrate that the earthquake motion can be synthesized based on our newly developed phase model.