Stochastic Approach in the Analysis of Rocking Ground Motion

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ABSTRACT

The paper will present fundamentals of the implementation of stochastic approach into the classic decomposition of rocking ground motion (about horizontal axis). For this purpose a Stieltjes-Fourier spectral decomposition of stochastic process will be applied.

To cover the necessary evolution of the ground motion in time and frequency domains the Priestley's (1967) spectral decomposition of nonstationary random processes will be introduced and described in detail. The joint effect of body and surface wave contributions will be described in detail. The body wave effects will be analyzed using the approach of the classic paper by Trifunac (1982) while the effect of the Rayleigh waves will be given using the approach of Sugito et al. (1984).

In addition a simple formulation of the tower shaped structures to rocking ground motion will be shortly presented.

The question how to derive simplified, code formulae to account for the rocking effects will be addressed.

A brief presentation of rotational response spectra concept will be analyzed too.

References
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Trifunac MD (1982) A note on rotational components of earthquake motions for incident body waves, *Soil Dynamics and Earthquake Engineering*, vol.1, 1982, pp.11-19