# Wave propagation in a rotating random granular elastic medium

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The plane wave propagation in a linear random non-homogeneous granular elastic medium is considered, taking the elastic parameters as also the coefficient of friction between the individual grains varying randomly subject to the assumption that the entire frame of reference is rotating with uniform angular velocity $\overrightarrow{\Omega}$. The analysis is based on the dynamics of granular medium propounded by N.Oshima. The smooth perturbation technique relevant to the mean field is employed to derive the dispersion equation for longitudinal waves. The increase in wave speed due to randomness is modified by the presence of $\overleftarrow{\Omega}$. Another coupled dispersion equation representing two different types of complex propagating waves has been deduced and analyzed. The alteration in phase speeds as also in attenuation factors, which have been computed, depends upon $\overleftarrow{\Omega}$. Some numerical computations based on particular form of correlation functions have been attempted to describe the effects of randomness and rotation of the medium in various cases.

References:

[1]. F.C.Karal, J.B.Keller, Elastic, electromagnetic and other waves in random medium, J.Math.Phys., 5,537-547, 1964.

[2]. N.Oshima, Dynamics of Granular Media, Memoirs unifying study of the basic problems in engineering sciences by geometry, vol.1, Div. D, 11-120, Ed. K.Kondo, Bull.Earthquake Research Institute, Tokyo, Japan, 1955.

[3]. M.Schoenberg, D.Censor, Elastic waves in rotating media, Quart. Of App. Math., 34, 115-125, 1973..