Response of the beams on random Pasternak foundations subjected to harmonic moving loads

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Dynamic response of infinite beams supported by random viscoelastic Pasternak foundation subjected to harmonic moving loads is studied. Vertical stiffness in the support is assumed to follow a stochastic homogeneous field consisting of a small random variation around a deterministic mean value. By employing the first order perturbation theory and calculating appropriate Green's functions, the variance of the deflection and bending moment are obtained analytically in integral forms. To simulate the induced uncertainty, two practical cases of cosine and exponential covariance are utilized. A frequency analysis is performed and influences of the correlation length of the stiffness variation on the beam responses are investigated. It is found that in each frequency response there is a peak value of frequency, which behaves as a decreasing function of the correlation length. Among two coefficient of variation of the beam deflection and the bending moment, the former is higher in the case of exponential covariance and it is independent of the magnification of the correlation length.