Static and dynamic reliability analysis of laterally loaded piles using probability density evolution approach

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Abstract

Generally speaking, the probability density function is the most essential description of random event in objective physical world. Therefore, how to obtain the probability density function of the nonlinear response of the engineering structure under the stochastic load, will be one of the key scientific problems for reliability analysis, particularly in nonlinear dynamic problems. From the perspective of acquisition of probability density function, we investigate the static and dynamic reliability of the piles with laterally force considering the nonlinear constitutive of soil based on the probability density evolution method and equivalence extreme value concept. And the precision and efficiency of the proposed method are demonstrated in light of the Monte Carlo simulations.

Keywords: Stochastic Force, probability density function, reliability