Abstract

An analysis is undertaken of the rocking motion of a rigid block resting on a rigid foundation when subjected to a random ground acceleration by using an equivalent linear system. The method predicts the cumulative distribution function of the extreme values of the tilt angle and the results are compared with those obtained by other authors using a step-by-step numerical integration of the equation of motion. With the introduction of the analysis of the seismic risk, by means of the probabilistic law of the yearly maxima of the peak ground acceleration, a method of estimating the vulnerability is proposed which takes into account the maximum permissible rotation for the block and the strength of the block material.

In the latter case, an approximate relation between block rotation and maximum stress at the block base corner is introduced. This method is used to estimate the seismic vulnerability of some of the ancient monuments of the Imperial Forum in Rome.