



## Assessment of Seismic Slope Stability through Incremental Dynamic Analysis

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### Abstract

Analysis of seismic slope stability is important to predict the failure of natural or artificial slopes under earthquake-induced shaking. The severity of damage to a slope depends on several factors like variability in ground motions, geometry of the slope and the dynamic soil properties of the slope and foundation material and their associated uncertainties. So, probabilistic analysis of slope presents a more practical way for seismic vulnerability assessment considering different sources of uncertainties. Seismic fragility analysis is a probabilistic way for seismic risk assessment that describes the probability of exceedance of different prescribed limit states at different seismic intensity levels. A fragility function indicates the probability of collapse or the probability of exceedance of some other limit state of interest which is estimated using statistical procedures. In this study, incremental dynamic analysis (IDA) based seismic fragility assessment is performed to evaluate the seismic performance of a slope. To quantify the performance and seismic demand of slope, different vulnerability states of the slope are selected, and the probability of exceeding these selected vulnerability states for different seismic intensity is determined from the obtained fragility function parameters. The study clearly exhibits the importance of seismic fragility curves to assess the performance of a slope under seismic conditions.

**Keywords:** Seismic slope stability, Incremental dynamic analysis, Vulnerability states, Seismic fragility assessment