A simple spectral shape proxy for far-source sites

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Abstract

This paper presents a spectral shape proxy stems from geometric mean consisting of spectral ordinates at the structure's first mode period to that of much larger period. The proposed model denoted by α_geo is normalized by spectral ordinate at $2T\_1$ for reducing dispersion and scaling level problem. Another arithmetic mean model, α_Ar, is also developed to be used for comparison purpose of the geometric mean model. The 26 RC-SMF structures and 78 far-field ground motions are selected to evaluate the performance of the model as a case study. IDA method is used to calculate collapse capacities of the selected structures. Series of linear relationship are developed among the model values and corresponding structures' collapse capacities demonstrating strong coefficient of determinations ($R\hat{}2$). Performances of the presented models "efficiency" and "sufficiency" aspects are shown to be as strong as those of recently proposed predictor, SaRatio, while benefits from simplicity. Utilization of the proposed model are: as an element of vector valued IM, as a collapse capacity predictor for structures at far-source sites, collapse margin ratio for collapse safety evaluation of structures.

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