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خلاصه مقاله:

Time history analyses as crucial means in many earthquake engineering applications are highly dependent to characteristics of the seismic excitation record so that the resulting responses may vary from case to case. Strong ground motion scaling is a known codified solution to reduce such a dependency and increase reliability of time history analyses. The well-known code practice may result in highly non-economic designs due to considerable error in the spectra scaled to match the target code spectrum. This problem is formulated here in an optimization framework with the scaling coefficients as the design variables. Harmony search as a recent meta-heuristic algorithm is utilized to solve the problem and is applied to the treated examples. Using a variety of target period ranges the scaling error is evaluated and studied after more unified via optimization. The effect of base structural period and interval variation on the scaling error is then studied in addition to considerable error decrease with respect to traditional code-based procedure. The results also show dependency of spectral matching error to the period-interval elongation/variation,the base-structural period and more error sensitivity for narrow-band resonance with the filtered records on softer soil types.

کلمات کلیدی:

Strong Ground Motion, Optimal Spectral Scaling, Matching Period Interval, Harmony Search

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