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An Optimized Method for Calculating the Linear and Nonlinear Response of SDOF System Subjected to an Arbitrary Base Excitation

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Abstract : Finding the linear and nonlinear responses of a typical single-degree-of-freedom system (SDOF) is always being regarded as a time-consuming process. This study attempts to provide modifications in the renowned Newmark method in order to make it more time efficient than it used to be and make it more accurate by modifying the system in its own non-linear state. The efficacy of the presented method is demonstrated by assigning three base excitations such as Tabas 1978, El Centro 1940, and MEXICO CITY/SCT 1985 earthquakes to a SDOF system, that is, SDOF, to compute the strength reduction factor, yield pseudo acceleration, and ductility factor.

Keywords : single-degree-of-freedom system (SDOF), linear acceleration method, nonlinear excited system, equivalent displacement method, equivalent energy method
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