Influence of Smoothness in Skeleton Curve of Railway Bridge and Viaduct on Nonlinear Response Spectrum

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This study investigates how the smoothness of the skeleton curve affects the seismic response of a structure before it yields. The bulging of the skeleton curve was characterized by the ratio of initial stiffness in a bilinear model, followed by numerous nonlinear dynamic analyses. The results showed that, for ductility $\mu = 1$, the ratio of the required demand yield seismic coefficient drops below 1 when the natural period of the structure (T_{eq}) is short, reducing the seismic response values. The findings of this study can be applied to seismic response for structures. Particularly, they are expected to improve the accuracy and rationalization of structural behavior before and after yielding, specifically the structural behavior during Level 1 earthquakes and the immediate estimation of structural integrity after an earthquake.