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## A comparative assessment of probabilistic seismic hazard for pseudo-negative stiffness control of a steel base-isolated building

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Pseudo-negative stiffness (PNS) control is a semi-active control scheme that is aimed to track a negative-stiffness hysteretic loop. It is regarded as one of the most promising control schemes for vibration reduction. However, its effectiveness was demonstrated only by a few individual seismic records. In view of the variability of seismic characteristics, a more systematic investigation is needed for it. Using the methodology of probabilistic seismic hazard assessment (PSHA), the effects of PNS control on benchmark base-isolated building is studied. Comparisons are made between PNS control scheme and bilinear isolated scheme. The advantage of PSHA employed herein is that it allows for the consideration of effects of PNS control over various ground motions with different frequency contents or intensities. Moreover, the description of seismic responses in probabilistic format with PSHA is more explicit and scientifically complete. The spectral acceleration is selected as the seismic intensity measure and three response parameters (i.e. inter-storey drift ratio, isolation bearing deformation and floor acceleration) are considered to describe the damage associated with structure safety and structure functionality. For the particular controlled systems with nonlinear properties and thus with potential variable dynamic characteristics under different ground motions, an optimal period searching procedure is developed for the spectral acceleration calculation and hence leading to a more effective probabilistic estimation. The results of PSHA show that the PNS control scheme can achieve better performance with respect to structure safety and structure functionality than bilinear isolated scheme.

### Biography

Wei Gong is a Doctoral Researcher from China applying for Doctor degree from Huazhong University of Science and Technology. She has published 2 papers in chinese journals and several papers are about to publish. She is a younger researcher and her major research direction is seismic control of base-isolated structure.

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