

## **Estimation of Seismic Fragility Curve for Equipment in Nuclear Power Plant Structure with Nonlinear Behavior**

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### **ABSTRACT**

For nuclear power plant, fragility curves of the structure and the in-structure equipment are calculated to conduct seismic risk assessment. Seismic response analysis under strong seismic motion should be conducted to calculate fragility curve. A nuclear power plant structure with shear wall under strong seismic excitation can exhibit nonlinear hysteretic behavior. Seismic response of equipment can be conventionally assumed to be log-normally distributed, but the assumption cannot be always valid under the nonlinear behavior of the structure. In this case, lognormal assumption of the equipment response cannot be applied in calculating the fragility curve. Instead, sampling-based method can be used to construct a fragility curve for equipment. In this paper, a reactor containment building structure with shear wall is considered to estimate the fragility curve for equipment. The distribution of equipment response is calculated using an efficient method for calculating probabilistic floor response spectrum. The result is compared with the fragility curve of equipment in the structure without nonlinear behavior.

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