

## SEISMIC RESPONSE OF STRUCTURES EQUIPPED WITH LINEAR AND NONLINEAR MASS DAMPING SYSTEMS

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**Keywords:** Seismic Response, Tuned Mass Damper, Nonlinear Energy Sink, Hysteretic Nonlinear Energy Sink.

### ABSTRACT

The seismic response of structures equipped with linear and nonlinear mass damping systems is investigated herein. Three optimized mass damping systems mounted at the top of two different structural configurations are tested under an artificial seismic motion to assess their response. The artificial seismic motion is generated using the SIMQKE software [1], and matching a particular EC8 response spectrum. The aforementioned mass damping systems consists of (i) a traditional linear Tuned Mass Damper (TMD), (ii) a type-I Nonlinear Energy Sink (NES) with a nonlinear elastic spring of the Duffing oscillator, and (iii) a Friction Nonlinear Energy Sink (FNES) which extends NES with a friction element and a linear elastic spring of potentially negative stiffness. The results for each configuration are compared with a set of ground motion time histories, referred as FF (far field), which is identical to the set used in [2]. The results showed that different configuration optimize certain response quantities. An interesting observation is that the mean results from the set of ground motion time histories, when the nonlinear mass damping systems are employed, show a significant variability compared to the results from the artificial seismic motion.

### REFERENCES

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