

عنوان مقاله:

Optimum Seismic Design of Tuned Story Mass Damper Using Multi-Objective Genetic Algorithm

محل انتشار:

فصلنامه زلزله شناسی و مهندسی زلزله، دوره 18، شماره 4 (سال: 1396)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

A new system called Tuned Story Mass Damper (TSMD) is proposed and modified to enhance the seismic performance of mid-rise buildings. In TSMD systems, some part of a story's mass is utilized as Mass Damper, and an external passive damping device is used to provide the expected control force. For an ۱۱-story structural model under seismic excitations, the equations of motion are solved in state space and two objective functions, the maximum displacement and maximum velocity of the top floor are considered to be minimized simultaneously. Using a fast and elitist Non-dominated Sorting Genetic Algorithm (NSGA-II) approach, the optimum design parameters of the TSMD system, including mass, stiffness and damping as well as the best location of the TSMD system among the floors of the structure are obtained. The results show that considering the TSMD system on the fifth floor leads to the most reduction in displacement and velocity, not only for the roof, but also for the other floors as well. For the system under study, comparing with the noncontrolled system, a reduction of about ۳۱% on maximum displacement and ۴۲% on maximum velocity of the top floor are obtained.

کلمات کلیدی:

Optimization, Seismic Response, genetic algorithm, Tuned Story Mass Damper

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