

Optimization of tuned mass damper parameters with differential evolution algorithm

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ABSTRACT

Tuned mass dampers (TMDs) have been extensively used to reduce undesirable vibrations in civil engineering structures. In this paper, the optimum parameters of TMD are to be determined in order to minimize the dynamic response of a shear building system under earthquake loading. A numerical optimization criterion is proposed, based on the interstory drift between adjacent stories. For this aim, a computational scheme is developed using the Newmark approach to determine the structural response in terms of displacement, velocity and acceleration. The differential evolution algorithm has been employed for the solution of the optimization problem and the optimum TMD parameters are compared with other values given in the literature. Results show that the response obtained after the TMD optimization is considerably reduced.