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New active control algorithm based on uniform deformations

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Active control is an adaptive way for motion control in structures. When a structure is excited by an earthquake, an active control device can apply a controlling force adaptively to structure in order to reduce the structural vibrations. There are numerous active control algorithms for achieving desired control force which is applied by active control devices to structures. Here in this paper the main concern is uniformity of deformations in order to maximum use ductility capacity of the structural resisting elements, this point may yields reducing damages. In common active control algorithms there is no attention to deformation uniformity and reducing damages independently and the main concern is reducing responses separately. In this research a new active control algorithm is proposed with respect to uniformity of drifts in a building structure and then the efficiency of proposed algorithm is investigated through a numerical example. An optimized virtual auxiliary frame with pinned connections (VAP) is added to building structure and controls desired responses and makes structure deform more uniform. VAP beams axial force is filtered, forms filtered VAPA algorithm. This new proposed algorithm is simple and effective in reducing responses and makes them more uniform simultaneously.

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