

## عنوان مقاله:

FUZZY OPTIMAL CONTROL OF MULTI-BAY CABLE-STAYED BRIDGES WITH EXCESSIVE DEGREES OF FREEDOM UNDER SEVERE UNCERTAIN SEISMIC EXCITATION

## محل انتشار:

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## خلاصه مقاله:

An innovative interference between full-order finite element models of excessive degrees of freedom structures such as multi-bay too long bridges and realizable balanced reduced order state-space representation of them, have been established. To deal with some unwanted defeats in analysis and design of controllers for large-scale with huge amount elements such as time-lags, time-delay, noise rejection from sensors, and unpredictable lack of stiffness of retaining cables, we use from stochastic optimal control theory combined with fuzzy inference system to design of controllers. Stochastic optimal control method able to compensate and observed immeasurable state variables whose couldn't be sense and fuzzy inference mechanism can deal with nonlinearity of structure-controllers and uncertainty or fluctuation of seismic excitation. To do the above mentioned, we construct the comprehensive simulation which composed of the evaluation model, input/output variable user's defined, sample controller design, digitalized compensators/controllers, and FLC(fuzzy logic controllers) to Fuzzification, decision making, inference engine, Defuzzification which attached to the simulation blocks. The bridge model has 586m length, three long bay, with two tall piers which sustain mid deck of bridge and two bent which supports two end-stayed of the bridged. The three-dimension finite element model of the bridge includes of 846 elements, 584 active degrees of freedom, and 16 connection nodes to installed actuator devices. To verification of efficiency of control procedure, two feasible approaches of optimal control process such as sliding mode control (SMC) and fuzzy sliding mode control (FSMC) have been treated to control algorithm. After intensive simulation processes, Numerical results indicate that the seismic responses of controlled bridge under three sample severe Earthquake, i.e. El-Centro, Northridge, and Kobe with uncertain magnification influence were diminished appropriately in compared with considered actuator's constraints.

## کلمات کلیدی:

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