



# Comparing Semi Active Control of Bridge via Variable Stiffness and Damping Systems and MR Dampers

Fereydoon Amini <sup>1\*</sup>, Sara Zalaghi <sup>1</sup>

<sup>1\*</sup> Professor, College of Civil Engineering, Iran University of Science and Technology, Tehran, Iran  
(famini@iust.ac.ir)

<sup>1</sup> Research Assistant, College of Civil Engineering, Iran University of Science and Technology, Tehran, Iran

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## ABSTRACT

Semi active devices can be used to control the responses of a continuous bridge during earthquake excitation. They are capable of offering the adaptability of active devices and stability and reliability of passive devices. This study proposes two semi-active control method protection of bridge using variable stiffness and damping systems and MR dampers. The first method is variable stiffness and damping with eight different (on-off) control schemes which is optimized with genetic algorithm. Genetic algorithm is used to define the parameters of this method. In the second method, an intelligent controller using fuzzy control of MR damper is developed. In particular, a fuzzy logic controller is designed to determine the command voltage of MR dampers. In order to evaluate the effectiveness of the proposed method, the performances of the proposed controllers are compared in numerical study. Results reveal that the developed controllers can effectively control both displacement and acceleration responses of the continuous bridge.

## Keywords:

Semi-active devices, MR damper, Variable stiffness, Variable damping, GA algorithm, Fuzzy logic control.