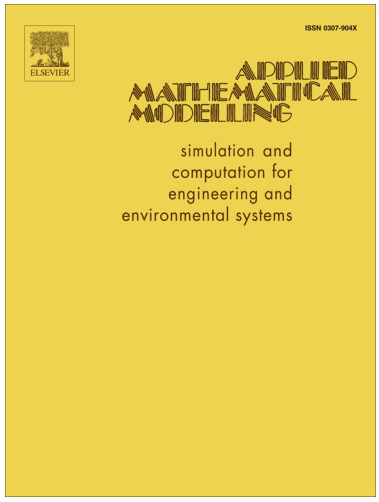

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Genetic algorithm based wireless vibration control of multiple modal for a beam by using photostrictive actuators

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ABSTRACT

The lanthanum-modified lead zirconate titanate (PLZT) actuator, which are capable of converting photonic energy to mechanical motion, have great potential in applications of remote structural vibration control of smart structures and machines. In this paper, a novel genetic algorithm based controlling algorithm for multi-modal vibration control of beam structures via photostrictive actuators is proposed. Two pairs of photostrictive actuators are laminated with the beams and the alternation of light irradiation is in accordance with the changing of the corresponding modal velocity direction. The modal force indexes for beams with different boundary conditions are derived and a binary-coded GA is used to optimize the locations and sizes of photostrictive actuators to maximize the modal force index and guarantee the overall modal force index induced by two pairs of photostrictive actuators is positive. The control effect of multiple vibration modes of beams under

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