

## عنوان مقاله:

OPTIMAL SENSOR PLACEMENT FOR MODAL IDENTIFICATION OF A STRAP-BRACED COLD FORMED STEEL  
FRAME BASED ON IMPROVED GENETIC ALGORITHM

## محل انتشار:

مجله بهینه سازی در مهندسی عمران، دوره 4، شماره 1 (سال: 1392)

تعداد صفحات اصل مقاله: 27

## نویسندگان:

F. Zahedi Tajrishi  
A. R. Mirza Goltabar Roshan

## خلاصه مقاله:

This paper is concerned with the determination of optimal sensor locations for structural modal identification in a strap-braced cold formed steel frame based on an improved genetic algorithm (IGA). Six different optimal sensor placement performance indices have been taken as the fitness functions two based on modal assurance criterion (MAC), two based on maximization of the determinant of a Fisher information matrix (FIM), one aim on the maximization of the modal energy and the last is a combination of two aforementioned indices. The decimal two-dimension array coding method instead of binary coding method is applied to code the solution. Forced mutation operator is applied whenever the identical genes produce via the crossover procedure. An improvement is also introduced to mutation operator of the IGA. A verified computational simulation of a strap-braced cold formed steel frame model has been implemented to demonstrate the effectiveness and application of the proposed method. The obtained optimal sensor placements using IGA are compared with those gained by the conventional methods based on several criteria such as norms of FIM and minimum in off-diagonal terms of MAC. The results showed that the proposed IGA can provide sensor locations as well as the conventional methods. More important, based on the criteria, four of the six fitness functions, can identify the vibration characteristics of the frame model accurately. It is shown through the example that in comparison with the MAC-based performance indices, the use of the FIM-based fitness functions results in more acceptable and reasonable configurations.

## کلمات کلیدی:

Optimal sensor placement, improved genetic algorithm, cold formed steel, strap brace, modal analysis, modal assurance criterion

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1831426>

