Abstract :

This paper presents a new damage detection and localization technique based on the changes in vibration parameters using BAT and Particle Swarm Optimization algorithm. The finite element method is used to apply damage at specific element(s) of the considered beams. The damage is represented by a reduction in Young's modulus and the identification of damage is formulated as an optimization problem using objective function based on Modal Scale Factor and changes in natural frequencies. A procedure for detecting and locating damage of beam-like structures based on BAT algorithm is used. This approach presents a method that can be used to detect the single and multiple-damage positions and the rate of damage in structural elements with high accuracy after the first iteration. The results obtained using BAT algorithm are compared to those obtained using Particle Swarm Optimization Algorithm. By taking noise into account in the damage detection and localization problem, it is shown that our approach based on BAT algorithm can detect the damage locations with high accuracy.