Parametric modelling of twin rotor system using chaotic fractal search algorithm

ABSTRACT

Nature-inspired metaheuristic algorithms have emerged as an active research field in the past two decades due to their advantages such as simplicity in structure, flexibility in implementation and local optima avoidance. One of the latest optimisation algorithms is Stochastic Fractal Search (SFS) algorithm. This paper presents the application of enhanced Fractal Search algorithms with chaos in parametric modelling of a twin rotor system (TRS). Firstly, the improved Fractal Search algorithms were evaluated using 4 well-known classical benchmark functions with different dimension levels. Then, the modified Fractal Search algorithms are employed to optimise the parameters for an ARX model of twin rotor system in hovering mode. The final results found that Chaotic Fractal Search (CFS) algorithm with Gauss/Mouse map shows superiority over other enhanced SFS algorithms when applied both in Diffusion Process and Updating Process.

Keyword: Chaos maps; Chaotic fractal search; Optimisation algorithm; Twin rotor system