Optimal model order reduction based on hybridization of adaptive safe experimentation dynamics-nonlinear sine cosine algorithm

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ABSTRACT

Convoluted high-order structures as modeled through mathematical principle including telecommunication systems, power plants for urbanized energy supply and aerospace systems are often accompanied by the apparent setbacks in analyzing, experimentation and operational control. The complexity of such structures is proposedly decreased within the current study through introduction of a hybridized meta-heuristics fine-tuning approach between Adaptive Safe Experimentation Dynamics (ASED) and Nonlinear Sine Cosine Algorithm (NSCA). Entrapment within the local optima is hereby overcome through ASED by adaptive random perturbation, with improved exploration and exploitation of the introduced approach being further enabled by NSCA. The method's potency was evaluated through an empirically adopted 6th order numerical function. Experimentation outcomes uncovered profound robustness and consistency from ASED-NSCA against alternative modern optimization-based techniques towards comparatively outstanding model order reduction (MOR).

KEYWORDS

Adaptive safe experimentation dynamics; Meta-heuristics optimization; Model order reduction; Nonlinear sine cosine algorithm

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