عنوان مقاله:
Constrained Nonlinear Optimal Control via a Hybrid BA-SD

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خلاصه مقاله:
The non-convex behavior presented by nonlinear systems limits the application of classical optimization techniques to solve optimal control problems for these kinds of systems. This paperproposes a hybrid algorithm, namely BA-SD, by combining Bee algorithm (BA) with steepest descent(SD) method for numerically solving nonlinear optimal control (NOC) problems. The proposed algorithm includes the merits of BA and SD simultaneously. The motivation of presenting theproposed algorithm includes that BA is showed to converge to the region that global optimum issettled, rapidly during the initial stages of its search. However, around global optimum, the searchprocess will become slowly. In contrast, SD method has low ability to convergence to local optimum,but it can achieve faster convergent speed around global optimum and the convergent accuracy can behigher. In the proposed algorithm, at the beginning step of search procedure, BA is utilized to find a near optimum solution. In this case, the hybrid algorithm is used to enhance global search ability. When the change in fitness value is smaller than a predefined value, the searching procedure isswitched to SD to accelerate the search procedure and find an accurate solution. In this way, the algorithm finds an optimum solution more accurately. Simulations demonstrate the feasibility of the proposed algorithm

کلمات کلیدی:
Constrained Optimization,Swarm Intelligence,Bees Algorithm,Steepest Descent,Differential Evolution,Genetic Algorithm