On a smoothed penalty-based artificial fish swarm algorithm for global optimization

Ana Maria A.C. Rocha, M. Fernanda P. Costa and Edite M.G.P. Fernandes

This paper presents a coercive smoothed penalty framework for nonconvex constrained global optimization problems. At each iteration, the penalty framework requires an approximation to the global minimizer of the smoothed penalty function. This subproblem is solved by a stochastic population-based algorithm, known as the artificial fish swarm (AFS). We prove that, in the limit, the convergence to an approximate global minimizer of the real-valued smoothed penalty function is guaranteed with probability one, using the limiting behavior of Markov chains. Preliminary numerical experiments show that the presented penalty algorithm based on the AFS algorithm gives very competitive results when compared with other stochastic penalty-based methods.