

# A conjugate gradient method for global optimization via a random perturbations

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**Abstract:** In this paper a method for solving global optimization problems where the objective function is not necessarily convex is presented. This method is a modification of the Polak-Ribière conjugate gradient method involving the adjunction of a stochastic perturbation. This approach leads to a stochastic descent method where the deterministic sequence generated by Polak-Ribière conjugate gradient method is replaced by a sequence of random variables. Mathematical results concerning the convergence to a global minimum are established. Numerical experiments are achieved on some typical test problems, particularly the engineering problem of Lennard-Jones clusters. A comparison with well known methods is carried out to show the performance of our algorithm.

**Keywords:** Global optimization, Random perturbation, Polak-Ribière conjugate gradient method, Lennard-Jones clusters problem.

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