



## A KRIGING-BASED UNCONSTRAINED GLOBAL OPTIMIZATION ALGORITHM

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*Abstract: - Efficient Global Optimization (EGO) algorithm with Kriging model is stable and effective for an expensive black-box function. However, How to get a more global optimal point on the basis of surrogates has been concerned in simulation-based design optimization. In order to better solve a black-box unconstrained optimization problem, this paper introduces a new EGO method named improved generalized EGO (IGEGO), in which two targets will be achieved: using Kriging surrogate model and guiding the optimal searching direction into more promising regions. Kriging modeling which can fast construct an approximation model is the premise of performing optimization. Next, a new infill sampling criterion (ISC) called improved generalized expected improvement which round off Euclidean norm on variation of the optimal solutions of parameter  $\theta$  to replace parameter  $g$  can effectively balance global and local search in IGEGO method. Twelve numerical tests and an engineering example are given to illustrate the reliability, applicability and effectiveness of the present method.*

**Index terms:** Global optimization, Black-box function, Efficient Global Optimization (EGO), Kriging model, Infill sampling criterion.