

Tutorial: Biased random-key genetic algorithms

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A biased random-key genetic algorithm (BRKGA) is a metaheuristic for combinatorial and continuous global optimization. In this tutorial, we introduce BRKGAs and show how they can be applied to find optimal or near-optimal solutions to optimization problems. The tutorial is organized as two 1.5 hour sections spread over two days.

In the first day, we introduce the general concepts of the method. We first briefly cover basic notions of combinatorial and continuous global optimization. We then review the basic idea of genetic algorithms (GAs). Finally we present BRKGAs, pointing out the differences between them and classical GAs. We consider the basic architecture of BRKGAs and then concentrate on each specific component. Finally, we consider extensions to the basic architecture. Throughout our discussion we make use of a classical combinatorial optimization problem to illustrate the metaheuristic.

In the second day, we consider implementation and applications of BRKGAs. We begin by describing an application programming interface (API) for BRKGAs and then describe applications of BRKGAs on several combinatorial and continuous global optimization problems.