Evolutionary multi-objective optimization

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Kalyanmoy Deb and student co-author earn international recognition from IEEE

Kalyanmoy Deb, Koenig Endowed Chair and professor of electrical and computer engineering, and his student co-author, Himanshu Jain, received the "IEEE Transactions on Evolutionary Computation Outstanding Paper Award" in San Sebastian, Spain, in June.

The name of the paper is "An Evolutionary Many-Objective Optimization Algorithm Using Reference-Point-Based Nondominated Sorting Approach, Part I: Solving Problems With Box Constraints."

The award was presented by the IEEE Computational Intelligence Society for the most outstanding paper among the 40 published in 2014.

The award-winning paper is the fourth most popular downloaded article of the journal since its inception in 1997 at: [http://tinyurl.com/y72yemb6](http://tinyurl.com/y72yemb6).

**Brief abstract of article:**
There is a growing need for developing evolutionary multi-objective optimization (EMO) algorithms for handling four or more objectives optimization problems. In this paper, we recognize a few recent efforts and discuss a number of viable directions for developing a potential EMO algorithm for solving many-objective optimization problems. Thereafter, we suggest a reference-point-based many-objective evolutionary algorithm following NSGA-II framework (NSGA-III) that emphasizes population members that are non-dominated, yet close to a set of supplied reference points. The proposed NSGA-III is applied to a number of many-objective test problems with three to 15 objectives and compared with two versions of a recently suggested EMO algorithm (MOEA/D). While each of the two MOEA/D methods works well on different classes of problems, the proposed NSGA-III is found to produce satisfactory results on all problems considered in this paper. This paper presents results on unconstrained problems, and the sequel paper considers constrained and other specialties in handling many-objective optimization problems.
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