The Multiobjective Optimization Package of IOSO; Applications and Future Trends

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Indirect Optimization on the basis of Self-Organization (IOSO), first introduced by Professor Egorov I.N., designed for solving complex problems faster, has been successfully applied in searching for optimal decisions. It is based on the Response Surface (RS) methodology approach and on universal mathematical algorithms that can easily be applied to deal with MOO problems.

Based on IOSO it is assumed that if a problem could be represented by a mathematical model, IOSO optimization technology is able to approximate it into certain degrees. During operation, the information about the system behavior is stored for the points in the neighborhood of the extremum, therefore the RS model of design space will be more accurate providing wider range of capabilities, and would be practically insensitive with respect to the types of objective function and constraints.

In this paper the applications of IOSO in the field of industrial optimization are reviewed. This paper identifies recent approaches to utilizing the IOSO and the challenges that it presents to the Multiobjective Optimization (MOO) and Multiple Criteria Decision Making (MCDM) community. A survey of existing work, organized by application area, forms the main body of the review, following an introduction to the key concepts in MOO and MCDM. An original contribution of the review is the identification of strengths and weaknesses of technique, i.e. these are used to explain the reasons behind the use of IOSO in each application area and also to point the way to potential future uses of the technique. An overview of different approaches for Multiobjective design optimization utilizing IOSO is presented. The study identifies time as the major challenge and key to future success for IOSO strategy.

References

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