Abstract

A novel environment for optimization, analytics and decision support in general engineering design problems is introduced. The utilized methodology is based on reactive search optimization (RSO) procedure and its recently implemented visualization software packages. The new set of powerful integrated data mining, modeling, visualization and learning tools via a handy procedure stretches beyond a decision-making task and attempts to discover new optimal designs relating to decision variables and objectives, so that a deeper understanding of the underlying problem can be obtained. In an optimal engineering design environment as such solving the multicriteria decision-making (MCDM) problem is considered as a combined task of optimization and decision-making. Yet in solving real-life MCDM problems often most of attention has been on finding the complete Pareto-optimal set of the associated multiobjective optimization (MOO) problem and less on decision-making. In this paper, along with presenting two case studies, the proposed interactive procedure which involves the decision-maker (DM) in the process addresses this issue effectively. Moreover the methodology delivers the capability of handling the big data often associated with production decision-making as well as materials selection tasks in engineering design problems.
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Index Terms

Computer Science  Decision Support
Keywords

Optimal engineering design interactive multicriteria decision making reactive search optimization

multiobjective optimization