

BAYESIAN METHOD FOR THE SOLUTION OF AN ENGINEERING DESIGN INVERSE PROBLEM

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Abstract: In this article, numerical methods for solving engineering problems defined as multicriteria optimization and inverse problem are presented. It deals with the optimization of the design of thermoacoustic engine in the frame of which both types of tasks are solved. The first heuristic serves to find many p-optimal solutions simultaneously, which represents a compromise between usually mutually contradictory goals at work. Based on them, the full Pareto front is approximated. The inverse problem solution reproduces parameters for solutions located on a designated front but those that are not found in multicriteria optimization. In this article, it is proposed to use the RACO heuristics for determining p-optimal solutions and the Bayesian approach as a method for solving ill-conditioned inverse problems. Optimization of the construction of the thermoacoustic engine is aimed at verifying proposed methodology and present the possibility of using both methods in engineering problems. The problem discussed in this article has been formulated and the numerical methods used in the solution have been presented in details.