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Determination of Weak Pareto Frontier Solutions

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Condition: New. Publisher/Verlag: AV Akademikerverlag | under Probabilistic Constraints- A Neighborhood Search Approach | Revision with unchanged content. Conceptual design problems of complex systems have four common features; they are multidisciplinary, multi-objective, information uncertainties, and time constrained. Mathematically the first three features can be well addressed by solving a multi-objective, multidisciplinary optimization problem under probabilistic constraints and finding the Weak Pareto Frontier (WPF) solutions. The challenge then is how to find WPF solutions with manageable computational time and expense. In this research a framework is developed to meet this challenge, adopting surrogate models and a new neighborhood search method that is based on Monte Carlo simulation. A hybrid surrogate modeling method is formed consisting of Response Surface Methodology and Support Vector Regression (SVR) in order to achieve high accuracy for many kinds of problems with a small training sample. SVR is automated in a new way using a modified information criterion (MIC) based on model fitting error, model predicting error (MPE), and model complexity information. MPE is estimated inexpensively with a new method called Random Cross Validation. MIC is also used to select the best surrogate modeling method for a problem. | Format: Paperback | Language/Sprache: english | 316 pp.



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