

Sequential design of experiments and multi-objective optimization for the solutions of complex problems

MATTEO BORROTTI¹, Antonio Pievatolo²

¹*Energia Crescente S.r.l., Milano*

²*Institute for Applied Mathematics and Information Technologies, CNR-IMATI Milano*

Abstract

The rapid growth of technology has allowed experimenters and practitioners to develop and test complex solutions to their problems. An increasing number of variables and system responses characterizes optimal solutions. In many real-life problems, system responses conflict with each other, and optimizing a particular solution with respect to a single system response can lead to unacceptable results. Multi-objective formulations are a realistic approach to the solutions of these problems. In this work, we develop a multi-objective sequential design of experiments approach (DOE) based on the Pareto optimality concept and the Bayesian framework. Different theoretical aspects are investigated and the proposed approach is compared with state-of-the-art methods on a simulation study.