Zigzag Manifold Search for Multi-objective Optimization

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Abstract

Decision making based on multiple criteria is ubiquitous in business and engineering problems. To find the tradeoff (Pareto) optimal solutions is searching the solutions within an embedded manifold. The geometric structure of such manifolds is usually complex, and thus the optimization process is computationally challenging. We present and discuss the idea of a high-dimensional zigzag search method for multi-objective optimization problems. Some numerical examples considering 3 or more objectives will be tested and analyzed to demonstrate the efficiency of the proposed zigzag search method.