1077-49-1734   **Ahmad R Almomani*** (`almomaar@clarkson.edu`) and **Katie R. Fowler**. *A Comparison of Derivative-Free Optimization Methods with Constraint Methods.*

Derivative free methods are highly demanded by researches for solving optimization problems for which derivatives are unavailable or intractable to compute. A variety of algorithms, each with inherent strengths, weaknesses, and supporting theory have been developed and analyzed in the last two decades. For these methods, optimization is guided only by function values, which may be computationally expensive in some cases. In practice, constraints add a significant challenge. In this work we consider a variety of derivative-free methods; implicit filtering, a genetic algorithm, particle swarm optimization, and simulated annealing—paired with the standard penalty and barrier methods for handling constraints. We provide a comparison of methods to understand the best pairing of optimizer/constraint approach and include a new algorithm which combines implicit filtering with the filter method for constraints. We consider a suite of test problems that include jump discontinuities, low-high amplitude noise, and some higher dimensional problems. Performance and data profiles can help understand algorithm performance and guide users when choosing a solution approach.