

Black-Box Min-Max Optimization using CMA-ES

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Abstract: Simulation-based optimization, where the objective function value $f(x)$ is computed through a numerical simulation given design variable x , appears widely in engineering problems. However, it is often observed that a solution obtained by simulation-based optimization do not perform as well on the real environment as on the simulation, due to the difference between the real environment and the simulation. This is one of the factors that impair the reliability of the optimization result in the simulation. The problem of finding a solution robust to such error and uncertainty is often formulated as a minimax optimization, where we try to locate the best solution under the worst possible situation, to guarantee the worst case performance. In this talk, we present CMA-ES, which is recognized as one of the most powerful solvers for simulation-based optimization and has been applied to many real-world applications. Then, we present our recent developments in black-box minimax optimization using CMA-ES.