Abstract

IPOP-CMA-ES is one of the most powerful black-box optimization algorithms within the field of Evolution Strategies. However, its performance is subdued with the integration of elitism, which usually improves the behavior of most evolutionary algorithms. This poster's focus is twofold, involving a simple and effective approach to incorporating elitism into CMA-ES, and an efficient unbiased system for simultaneously running and comparing two different ES algorithms. This new system is called Dual-center CMA-ES. As the name describes, Dual-center-CMA-ES utilizes two centers which are synchronized in the sampling process, with the 2nd center (also known as the 'best' center or 'elite' center) dictating the generation of elite solutions.

IPOP-CMA-ES and Dual-center CMA-ES were run simultaneously with the previously mentioned system, where they share the same multivariate normally distributed random noise to remove random bias. Overall, the results suggested that Dual-center CMA-ES performed better than IPOP-CMA-ES on unimodal test functions from the BBOB test suite, such as rosenbrock and elliptical. The system also performed better on BBOB multimodal test functions such as ackley, rastrigin and griewank. These results may imply that unorthodox methods of elitism could be more promising.