

An Efficient Rank-1 Update for Cholesky CMA-ES Using Auxiliary Evolution Path

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ABSTRACT

Covariance matrix adaptation evolution strategies (CMA-ES) is a powerful optimizer. In this paper, we propose an efficient rank-1 update for the Cholesky covariance matrix adaptation evolution strategy (Cholesky CMA-ES) using an auxiliary evolution path. It accumulates the average mutation vector corresponding to the current search direction, which is used to update the evolution path. It is used to update the Cholesky factor. It avoids to maintain the additional inverse Cholesky factor, and reduces the computational complexity in the update procedure to a half. Further, we experimentally show that the auxiliary evolution path approximates to the inverse vector of the evolution path in terms of inverse Cholesky factor in the procedure. We experimentally show that the proposed method achieves comparative or even better performances on the test problems.

This paper will be presented at the IEEE Congress on Evolutionary Computation (PPSN XIV), June 5-8, 2017, Donostia-Sean Sebastlan, Spain.

Supervisor: Prof Qingfu Zhang

Research Interests: Evolutionary Computation and Machine Learning.

All are welcome!



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