# An improved multi-step gradient-type method for large scale optimization.

## ABSTRACT

In this paper, we propose an improved multi-step diagonal updating method for large scale unconstrained optimization. Our approach is based on constructing a new gradient-type method by means of interpolating curves. We measure the distances required to parameterize the interpolating polynomials via a norm defined by a positive-definite matrix. By developing on implicit updating approach we can obtain an improved version of Hessian approximation in diagonal matrix form, while avoiding the computational expenses of actually calculating the improved version of the approximation matrix. The effectiveness of our proposed method is evaluated by means of computational comparison with the BB method and its variants. We show that our method is globally convergent and only requires $O(n)$ memory allocations.

**Keyword:** Diagonal updating; Generalized weak secant equation; Global convergence; Multi-step gradient method.