Two-step diagonal Newton method for large-scale systems of nonlinear equations

ABSTRACT

We propose some improvements on a diagonal Newton's method for solving large-scale systems of nonlinear equations. In this approach, we use data from two preceding steps to improve the current approximate Jacobian in diagonal form. Via this approach, we can achieve a higher order of accuracy for Jacobian approximation when compares to other existing diagonal-type Newton's method. The results of our numerical tests, demonstrate a clear enhancement in numerical performance of our proposed method.

Keyword: Approximation; Diagonal updating; Large systems; Multi-step; Newton method