

An improved diagonal Jacobian approximation via a new quasi-Cauchy condition for solving large-scale systems of nonlinear equations

Abstract

We present a new diagonal quasi-Newton update with an improved diagonal Jacobian approximation for solving large-scale systems of nonlinear equations. In this approach, the Jacobian approximation is derived based on the quasi-Cauchy condition. The anticipation has been to further improve the performance of diagonal updating, by modifying the quasi-Cauchy relation so as to carry some additional information from the functions. The effectiveness of our proposed scheme is appraised through numerical comparison with some well-known Newton-like methods.

Keyword: Nonlinear equations; Jacobian approximation; Quasi-Cauchy condition; Quasi-Newton.