A new gradient method via least change secant update

ABSTRACT

The Barzilai–Borwein (BB) gradient method is favourable over the classical steepest descent method both in theory and in real computations. This method takes a 'fixed' step size rather than following a set of line search rules to ensure convergence. Along this line, we present a new approach for the two-point approximation to the quasi-Newton equation within the BB framework on the basis of a well-known least change result for the Davidon–Fletcher–Powell update and propose a new gradient method that belongs to the same class of BB gradient method in which the line search procedure is replaced by a fixed step size. Some preliminary numerical results suggest that improvements have been achieved.