

# HYBRID DIRECTION METHOD FOR SOLVING UNCONSTRAINED MINIMIZATION PROBLEMS

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**ABSTRACT:** Various search directions have been applied to find a minimizer in an unconstrained minimization problem, such as steepest descent direction, Newton direction, quasi-Newton directions, conjugate gradient direction, coordinate directions, etc. In the present investigation, some of these directions are linearly combined to produce a hybrid search direction for solving an unconstrained minimization problem. Special characters of these directions in the hybrid direction could lead to an improvement of the convergence speed and reduction in the number of function evaluations in the iteration process. Numerical tests on the hybrid directions are performed on the standard test problems (Moré 1981), in particular those with variable dimensions. Comparisons are also made between numerical results obtained from the methods using single directions and hybrid directions. It has been found that the hybrid direction method shows significant reduction in the number of iterations and function evaluations.

**KEYWORDS:** unconstrained minimization, quasi-Newton, conjugate gradient, steepest descent, hybrid directions