A New Class of Conjugate Gradient Methods Based on a Modified Search Direction for Unconstrained Optimization

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Abstract : Conjugate gradient methods have played a special role for solving large scale optimization problems due to the simplicity of their iteration, convergence properties and their low memory requirements. In this work, we propose a new class of conjugate gradient methods which ensures sufficient descent. Moreover, we propose a new search direction with the Wolfe line search technique for solving unconstrained optimization problems, a global convergence result for general functions is established provided that the line search satisfies the Wolfe conditions. Our numerical experiments indicate that our proposed methods are preferable and in general superior to the classical conjugate gradient methods in terms of efficiency and robustness.