



**GLOBAL CONVERGENCE OF A NEW TWO-PARAMETER
FAMILY OF NONLINEAR CONJUGATE
GRADIENT METHODS**

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Abstract

Conjugate gradient methods are an important class of methods for unconstrained optimization, especially for large-scale problems. Recently, they have been much studied. In this paper, we propose a new two-parameter family of conjugate gradient methods for unconstrained optimization. The two-parameter family of methods not only includes the already existing three practical nonlinear conjugate gradient methods, but has other family of conjugate gradient methods as subfamily. The two-parameter family of methods with the Wolfe line search is shown to ensure the descent property of each search direction. Some general convergence results are also established for the two-parameter family of methods. The numerical results show that this method is efficient for the given test problems. In addition the methods related to this family are uniformly discussed.

Keywords and phrases: unconstrained optimization, conjugate gradient method, line search, global convergence.

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