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A class of Dai-Liao conjugate gradient algorithm for nonlinear optimization problems

Communication Info

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Abstract

Hybrid methods of existing and modified conjugate gradient (CG) methods have been found to exhibit better performance for solving large-scale unconstrained optimization problems than the classical methods [5]. Several other methods in this category can be found in [1, 2, 5]. In continuation of the previous results, we propose hybrid schemes as motivated and inspired by [2, 3]. The schemes are defined using appropriate combinations of the search directions and included parameters. In this case, our methods are hybrid of HS and DY methods. Under some certain assumptions, descent and convergence properties were established with the underlying strong Wolfe line search. The results of the new schemes showed superior performance over the comparable existing ones in the sense of performance profiles of Dolan and More [4].

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References

[1] Adeleke, O. J., Osinuga, I. A. and Raji, R. A. 2021 A globally convergent hybrid FR-PRP conjugate gradient method for unconstrained optimization problems, *WSEAS Trans. Maths*, 20, 736 -744.

[2] Alhawarat, A., Alhamzi, G., Masmali, I. and Salleh, Z. 2021 A descent four-term conjugate gradient method with global convergence properties for unconstrained optimization problems, *Math. Probl. Eng.*, Volume 2021, Art. ID. 6219062, 14 pp.

[3] Dai, Y. H. and Liao, L. Z. 2001 New conjugacy conditions and related nonlinear conjugate gradient methods, *Appl. Math. Optim.*, 43 (1), 87 – 101.

[4] Dolan, E. and More, J. J. 2002 Benchmarking optimization software with performance profile, *Math. Prog.*, 91, 201 – 213.

[5] Stanimirovic, P. S., Ivanov, B, Djorjevic, S. and Brajevic, I. 2018 New hybrid conjugate gradient and Broyden-Fletcher-Goldfarb-Shanno conjugate gradient methods, *J. Optim. Theory and Appl.*, DOI: 10.1007/s10957-018-1324-3