Comparison ASCALCG, CG+ and CONMIN

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We compare the following algorithms:

1) **ASCALCG**: *Accelerated scaled memoryless BFGS preconditioned conjugate gradient algorithm for unconstrained optimization.* (Andrei)
2) **CONMIN**: *Algorithm 500, Minimization of unconstrained multivariate functions.* (Shanno – Phua)
3) **CG+**: Global convergence properties of conjugate gradient methods. (Liu – Nocedal –Waltz)

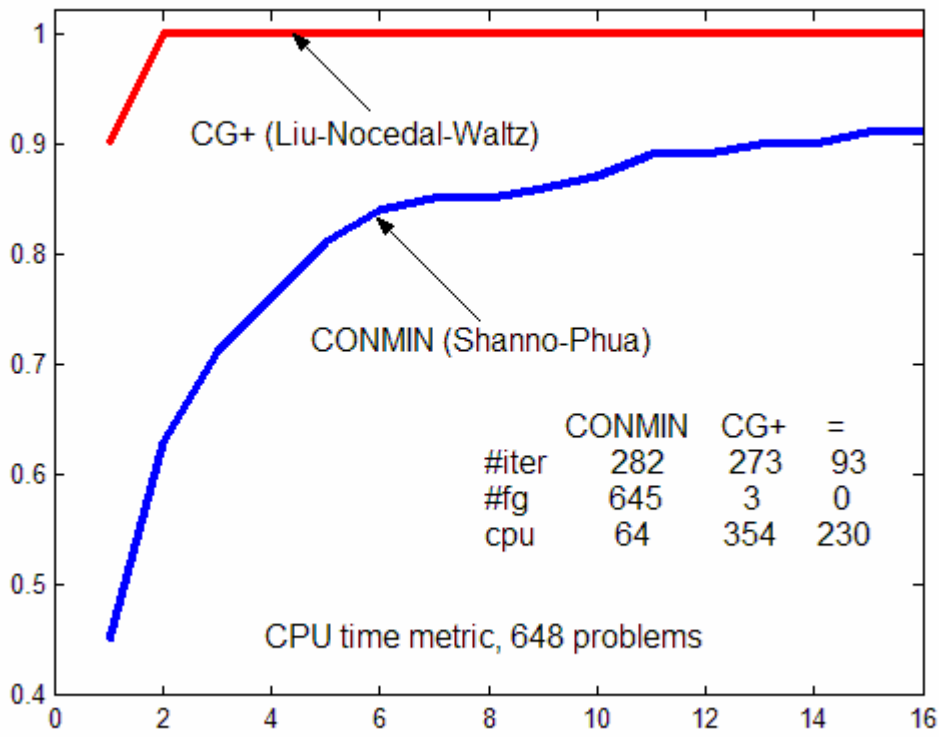

Fig. 1. CONMIN versus CG+

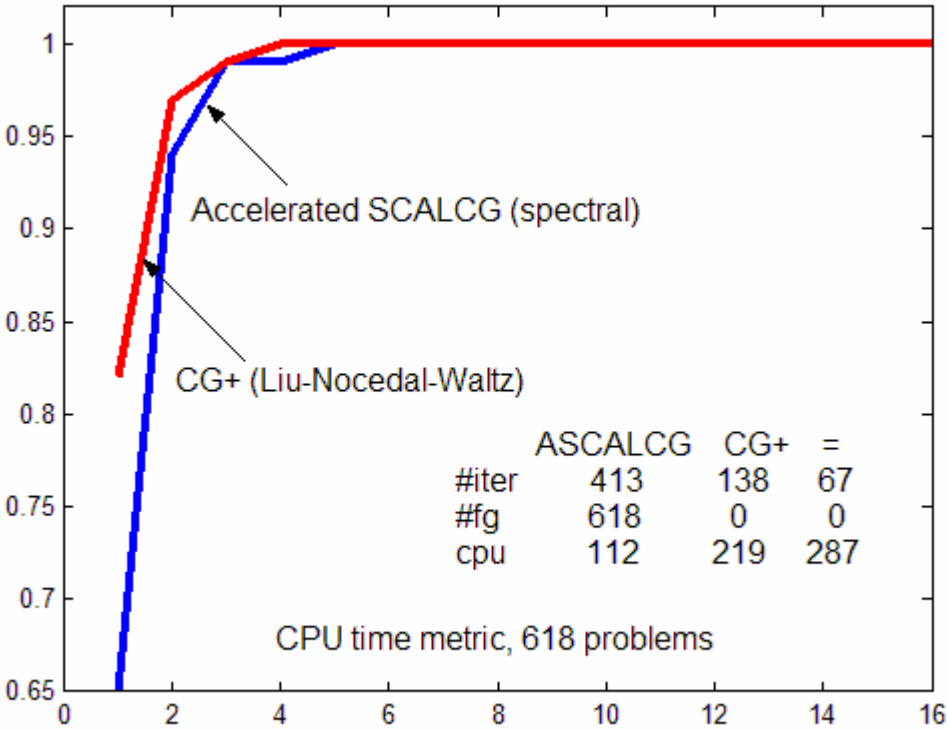

Fig. 2. ASCALCG versus CP+

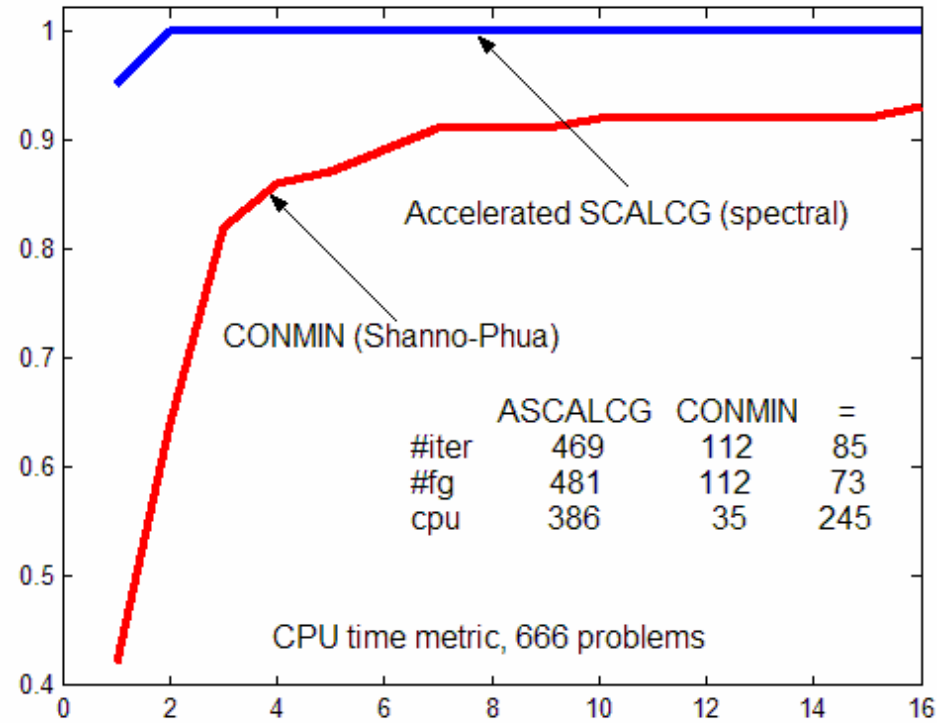

Fig. 3. ASCALCG versus CONMIN (Shanno-Phua)

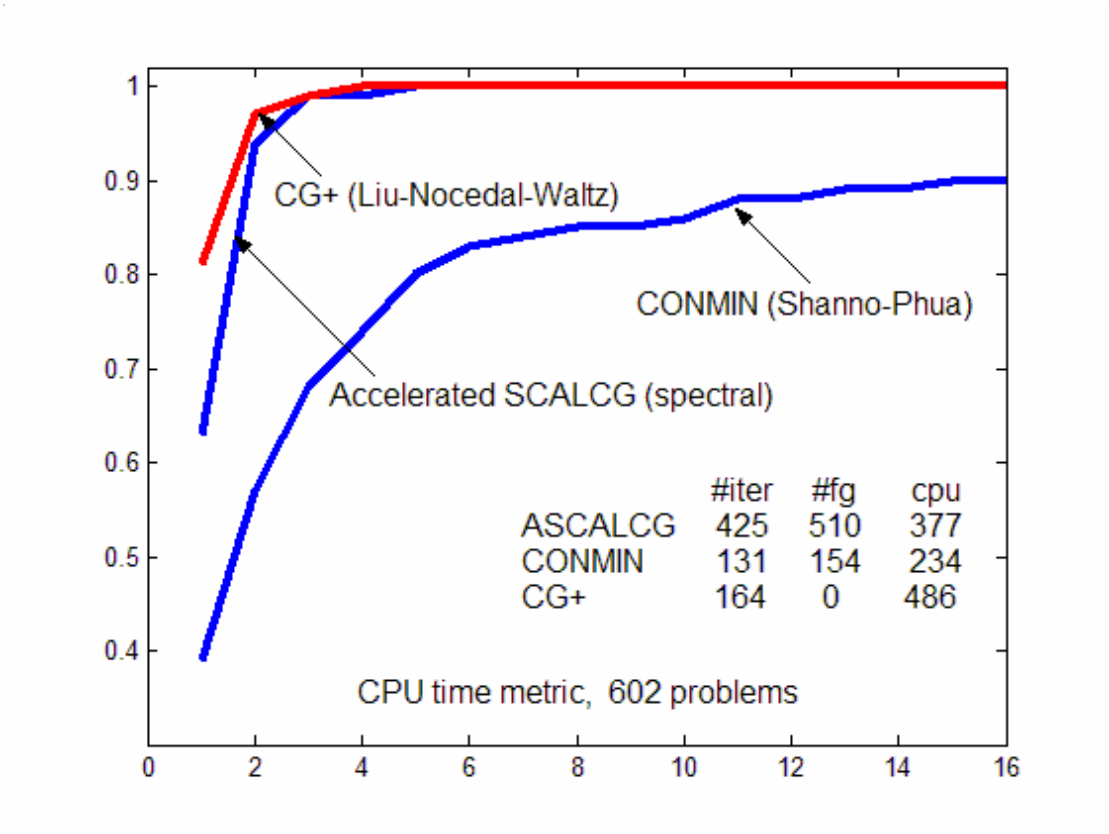

Fig. 4. ASCALCG, CONMIN and CG+.

ASCALCG and CONMIN use the Wolfe line search in implementation of Shanno and Phua (see: Shanno, D.F. and Phua, K.H., *Algorithm 500, Minimization of unconstrained multivariate functions*, ACM Trans. on Math. Soft. **2**, 87-94 (1976)). On the other hand, CG+ uses the Wolfe line search in implementation of Moré and Thuente (see J.J. Moré and D. Thuente, *Linesearch algorithm with guaranteed sufficient decrease.* ACM Trans. on Math. Soft. **20**, 286-307 (1994)).

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