

1067-90-1965

Darin Mohr* (dgmohr@math.uiowa.edu), 15 MacLean Hall, Department of Mathematics, The University of Iowa, Iowa City, IA 52242-1419. *Hybrid Runge-Kutta and Quasi-Newton Algorithms.*

Given a starting point, finding a local minimizer in unconstrained nonlinear optimization and a fixed point of a gradient system of ordinary differential equations (ODEs) are two closely related problems. Quasi-Newton algorithms are widely used in unconstrained nonlinear optimization while Runge-Kutta methods are widely used for the numerical integration of ODEs. In this work we consider hybrid algorithms combining search curves generated by low order implicit Runge-Kutta methods for gradient systems and quasi-Newton type updates of the Jacobian matrix such as the BFGS update. We have extended these ideas to the limited memory BFGS algorithm and we have examined the performance of the hybrid algorithms on a variety of problems. (Received September 22, 2010)