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**SARAH NATAJ AND S. H. LUI,**

*Superlinear convergence of quasi-Newton methods based on assumptions about the initial point*

Broyden's method is a quasi-Newton method which is used to solve a system of nonlinear equations. Almost all convergence theory in the literature assumes existence of a root and bounds on the nonlinear function and its derivative in some neighborhood of the root. All these conditions cannot be checked in practice. The motivation of this talk is to derive a convergence theory for Broyden where all assumptions can be verified, and the existence of a root and its superlinear rate of convergence are consequences of the theory. The method of BFGS is a quasi-Newton method for unconstrained minimization. Also, all known convergence theory assume existence of a solution and bounds of the function in a neighborhood of the minimizer. The other part of this talk would be on convergence theory of BFGS method where all assumptions are verifiable and existence of a minimizer and also discussing the superlinear convergence of the iteration.