Convergence of Constrained Gauss-Newton Methods, Well-Posedness of Parameter Estimation Problems and the Reliability of Confidence Estimates

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Abstract: Gauss-Newton methods are variants of Newton-type method, where the Hessian of Lagrangian is approximated by ignoring second order terms. Gauss-Newton methods show good local convergence properties in so-called "small residual" problems. In "large residual" problems, where the second order information is too significant to be ignored, the performance of the Gauss-Newton is poor or even divergent. In this talk we want to show that the bad performance of Gauss-Newton methods in problems is an advantage rather than a disadvantage of the method, since it indicates ill-posedness of the problem, insufficient modelling or lack of data, and hence the estimates, which can be achieved by using Newton methods, are not reliable.

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