

## **Nonlinear Preconditioning and Applications**

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Inexact Newton is a popular technique for solving large sparse nonlinear system of equations. In this talk, we discuss some recently developed versions of preconditioned inexact Newton methods which are more robust than the classical version when the nonlinearities in the system are not balanced. The preconditioners are constructed using a combination of some domain decomposition methods and nonlinear elimination methods. We show numerically that the preconditioned inexact Newton methods perform well for some nonlinearly difficult problems and on machines with large number of processors.