Chapter 1

Jacobian-Free Newton-Krylov Solver

A Jacobian-Free Newton-Krylov (JFNK) solver is a generic name for a class of methods for solving nonlinear systems. As implied by the name, these solvers are defined by two main characteristics: lac of a need to form the exact Jacobian (Jacobian-free) and Newton-like updates solved via a Krylov method (Newton-Krylov).