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Robust and Accurate Discretizations for Nonlinear PDEs

1700: Numerical Methods and Algorithms in Science and Engineering

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ABSTRACT

The use of numerical methods for the approximate solution of nonlinear partial differential equations (PDEs) is fundamental to modern science and engineering. There has been an increased interest in developing higher-order methods and reduced-order models that are as robust as low-order methods typically used in industry. For example, in the context of fluid mechanics problems, much effort has been dedicated to constructing provably-stable methods over the last decade (e.g., schemes which are entropy stable or invariant-domain preserving). In this minisymposium, the focus is on the mathematics that enable the use of discretization techniques (such as higher-order methods, adaptive methods, or reduced-order models) which preserve key properties of nonlinear PDEs.