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Solving nonlinear PDEs with Gaussian Processes

I present a simple, rigorous, and interpretable framework for solution of nonlinear PDEs based on the framework of Gaussian Processes. The proposed approach provides a natural generalization of kernel methods to nonlinear PDEs; has guaranteed convergence; and inherits the state-of-the-art computational complexity of linear solvers for dense kernel matrices. I will outline our approach by focusing on an example nonlinear elliptic PDE followed by further numerical examples and discussion of some theory.