Using higher order adjoints to accelerate the solution of UQ problems with random fields.
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- Goal:

  - Efficient non-intrusive solution of forward UQ problems with uncertainty modelled as Gaussian random fields.

- Key features:

  - Local derivatives for MC variance reduction.

  - Second-order adjoint method (Hessians).

  - Data-driven low-rank model.

  - Efficient, scalable implementation (FEniCS, dolfin-adjoint, PETSc).

- Results:

  - Stochastic non-linear Burgers problem - 3 orders of magnitude variance reduction over standard MC with a few extra PDE solves.

Initial

Deformed