

Research highlights

- A novel non-intrusive RB method coupling proper orthogonal decomposition with multi-layer perceptrons.
- Numerical studies for the nonlinear Poisson equation and the incompressible steady Navier-Stokes equations.
- Physical and geometrical parametrizations considered.
- Good agreement with the finite element method.
- Substantial speed-up enabled at the online stage as compared to a traditional RB strategy.
- Sensitivity analysis on the number of training samples and neurons.
- Comparison between MLP-based regression and cubic spline interpolation within the RB framework.