AN $h$-$p$ VERSION CONTINUOUS PETROV-GALERKIN FEM FOR NONLINEAR VOLterra INTEGRO-DIFFERENTIAL EQUATIONS

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We present an $h$-$p$ version of the continuous Petrov-Galerkin finite element method for nonlinear Volterra integro-differential equations. We derive a priori error bounds in the $L^2$- and $H^1$-norm that are explicit in the time steps, the approximation orders, and the regularity of the exact solution. Numerical experiments are provided to illustrate the theoretical results.