

Basics for polynomial interpolation on simplices

Polynomial interpolation is a key aspect in numerical analysis, used in very classical settings as for reconstructing a field from measures, computing integrals by quadrature formulas or selecting basis functions in finite element methods. We will review the roles of the three main characters featured in this action, namely, the representation of the domain by a mesh, the polynomial basis, the Vandermonde matrix as the link between the two aspects. We will present a general framework for the interpolation of differential k -forms on simplices that allows to retrieve fundamental concepts featuring in the classical scalar case. The Lebesgue constant pops up naturally to measure the stability of the interpolation and we will see the Runge phenomenon as a counter-example of this stability.

This work is done in collaboration with Ana Alonso Rodriguez and Ludovico Bruni Bruno.