Applications of linear barycentric rational interpolation at equispaced nodes

J.-P. Berrut
Département de Mathématiques
Université de Fribourg
Pérolles, 1700 Fribourg, Suisse
jean-paul.berrut@unifr.ch

Efficient linear and infinitely smooth approximation of functions from equidistant samples is a fascinating problem, at least since Runge showed in 1901 that it is not delivered by the interpolating polynomial.

In 1988, I suggested to substitute linear rational for polynomial interpolation by replacing the denominator 1 with a polynomial depending on the nodes, though not on the interpolated function. Unfortunately the so-obtained interpolant converges merely as the square of the mesh size. In 2007, Floater and Hormann have given for every integer a denominator that yields convergence of that prescribed order.

In the present talk I shall present the corresponding interpolant to those not familiar with it, before describing some of its applications, e.g., to differentiation, integration or the solution of boundary value problems. This is joint work with Georges Klein and Michael Floater.