INTERPOLATION AND APPROXIMATION IN SEVERAL VARIABLES

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Abstract

Let X be our favorite Banach space of continuous functions on $\mathbb{R}^n$ (e.g. C^m, $C^{m,\alpha}$, $W^{m,p}$). Given a real-valued function f defined on an (arbitrary) given set E in $\mathbb{R}^n$, we ask: How can we decide whether f extends to a function F in X? If such an F exists, then how small can we take its norm? What can we say about the derivatives of F? Can we take F to depend linearly on f?

What if the set E is finite? Can we compute an F whose norm in X has the smallest possible order of magnitude? How many computer operations does it take? What if we ask only that F agree approximately with f on E? What if we are allowed to discard a few points of E as "outliers"; which points should we discard?

A fundamental starting point for the above is the classical Whitney extension theorem.

The results are joint work with Arie Israel, Bo'az Klartag, Garving (Kevin) Luli, and Pavel Shvartsman.