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TITLE: Revisiting Quadratic Approximations

ABSTRACT: It is not a secret that continuous functions (at least in compact domains) may be approximated by polynomials. In order to achieve better approximations, one must use polynomials of higher degrees. One may also use piecewise polynomials, or splines. In this case, the degree of spline approximation may remain fixed (as the approximation improves), while the subdivision of the domain becomes finer. The theory of spline approximation in one dimension is well developed and understood, however the situation in higher dimensions is somewhat different. The commonplace approach is based on tensor products of one-dimensional splines and leads to polynomials of degrees which are way too high for many practical purposes. I will discuss problems and projects which arise when trying to approximate functions in several dimensions with splines of lowest possible order, in particular by quadratic splines.