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# More on Favard interpolation from subsets of a rectangular lattice

Thomas Kunkle

## Abstract

The problem of Favard interpolation from subsets of a rectangular lattice is addressed, paying particular attention to two desirable properties of the interpolation: localness and a bound independent of the aspect ratio of the lattice. We see circumstances in which these are mutually exclusive and constructions that offer one but not the other.

**Keywords:** interpolation, divided differences, multivariate.

**MSC:** Primary 41A05, 41A63; Secondary 65N22.

## §1. Introduction

An interpolation theorem of Favard [1] states that, if  $f$  is a real-valued function on an increasing sequence of real numbers  $(m_i)_{i \in I}$  and if  $n$  is a positive integer, then  $f$  has a smooth extension  $F$  whose  $n$ th derivative is bounded by  $f$ 's  $n$ th divided differences:

$$|D^n F| \leq C(n) \max_i |\Delta(m_i, \dots, m_{i+n})f|.$$

That is,  $f$  has an extension whose  $n$ th derivative is not more than a constant times its necessary minimum size. Favard's extension  $F$  depends locally and linearly on  $f$ , and the constant  $C(n)$  is independent of both  $f$  and the data points  $(m_i)_{i \in I}$ . (See [8, Theorem 3.1])

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K. Jetter

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