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Explicit formulas for compactly supported radial basis functions with minimal degree

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Abstract

We give various explicit formulas for the local polynomials defining compactly supported radial basis functions with minimal degree, introduced by H. Wendland [13, Chapter 9], where coefficients are obtained in an indirect recursive way.

Keywords: compactly supported radial basis function.

MSC: Primary 41A55; Secondary 41A25, 42B35.

§1. Introduction

We give various explicit formulas for the coefficients of the local polynomials defining compactly supported radial basis functions with minimal degree, introduced by H. Wendland in [12] and [13] where the coefficients are obtained in an indirect recursive way. They have the advantage of being expressed with universal constants, depending on the smoothness and the dimension of the space, and therefore to be more direct than recursive formulas given in the preceding papers. They can be useful in applications of radial basis functions with compact support to a number of problems either in approximation theory or in the solution of partial differential equations. See for example references [1–3, 5, 7, 8, 10–15] below. Note that there exist other kinds of compactly supported radial basis functions defined in various ways (see [2, 16]).

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