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Multivariate Sobolev-type orthogonal polynomials[†]

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Abstract

Multivariate orthogonal polynomials associated with a Sobolev-type inner product, that is, an inner product defined by adding to a measure the evaluation of the gradients in a fixed point, are studied. Orthogonal polynomials and kernel functions associated with this new inner product can be explicitly expressed in terms of those corresponding with the original measure. We apply our results to the particular case of the classical orthogonal polynomials on the unit ball, and we obtain the asymptotics of the kernel functions.

Keywords: orthogonal polynomials in several variables, Sobolev-type orthogonal polynomials, Sobolev-type orthogonal polynomials on the unit ball, asymptotics.

MSC: Primary 42C05; Secondary 33C50.

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