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Orthogonality for generalized Gegenbauer weight functions on the ball with an extra term on the sphere

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Orthogonal polynomials on the unit ball of $\mathbb{R}^d$ with respect to generalized Gegenbauer weight functions have been studied in [1, 3]. Using spherical polar coordinates they can be expressed in terms of h-harmonics and classical Jacobi polynomials with varying parameters. In this work we study a family of mutually orthogonal polynomials on the unit ball with respect to an inner product which includes the generalized Gegenbauer weight function plus an additional mass distributed on the sphere. First, connection formulas relating both families of multivariate orthogonal polynomials are obtained. Then, using the representation formula for these polynomials in terms of h-harmonics, differential properties will be deduced. In this way some previous results by the authors are extended (see [2]).

References

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