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Spherical polyharmonics

We introduce and develop the notion of spherical polyharmonics, which are a natural generalisation of spherical harmonics. In particular we study the theory of zonal polyharmonics, which allows us, analogously to zonal harmonics, to construct Poisson kernels for polyharmonic functions on the union of rotated balls. We find the representation of Poisson kernels and zonal polyharmonics in terms of the Gegenbauer polynomials. In this talk we also show the connection between the classical Poisson kernel for harmonic functions on the ball, Poisson kernels for polyharmonic functions on the union of rotated balls, and the Cauchy-Hua kernel for holomorphic functions on the Lie ball.

References

[1] H. Grzebuła, S. Michalik, *Spherical polyharmonics and Poisson kernels for polyharmonic functions*, Complex Var. Elliptic Equ. 64 (2019), 420–442.