# SOME PROPERTIES OF THE MACDONALD KERNEL AND THE LAPLACE TRANSFORM OF JACK POLYNOMIALS

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Abstract

Jack polynomials are an important family of symmetric polynomials that depend on a parameter $\alpha > 0$. For specific values of $\alpha$ we recover spherical functions on symmetric spaces isomorphic to symmetric cones.

I.G. Macdonald has introduced a certain kernel function $e(x, y)$ generalizing the exponential function $e^{xy}$ on the real line. It is defined by an infinite series involving the Jack polynomials. It can be viewed as the generalized hypergeometric functions ${}_0F_0$.

In this talk we will discuss our work with Siddhartha Sahi on some properties of the exponential kernel and the Jack polynomials. In particular we establish three key properties of the Macdonald kernel $e(x, y)$ and the associated Laplace/Fourier transforms. As anticipated by Macdonald, these results allow one to develop a reasonable theory of Fourier and Laplace transforms, and hypergeometric functions, for arbitrary $\alpha$ thereby generalizing classic results of Bochner, Herz, and many others, for symmetric cones.

Joint work with Siddhartha Sahi

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