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**The Spherical Transform of any  $k$ -Type in a Locally Compact Group**

Given a locally compact group  $G$  and a compact subgroup  $K$ , we develop and study a spherical transform on the convolution algebra  $C_{c,\delta}(G)$  of all continuous functions  $f$  with compact support on  $G$  such that  $\bar{\chi}_\delta * f = f * \bar{\chi}_\delta = f$ . Here  $\chi_\delta$  denotes the character of a unitary irreducible representation of  $K$  times its dimension. We obtain an inversion formula for the spherical transform by using the Fourier inversion formula in  $G$ .

The case of the group  $G = \mathrm{SU}(2, 1)$  and the compact subgroup  $K = \mathrm{U}(2)$  is discussed in detail. We give explicit expressions for the spherical transform and the corresponding inversion formula in terms of the matrix hypergeometric function  ${}_2H_1$ .

**Keywords:** Spherical transform, spherical functions, matrix hypergeometric function.

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