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The spherical transform for homogeneous vector bundles over Riemannian symmetric spaces

Roberto Camporesi

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Abstract. Let G/K be a Riemannian symmetric space of the noncompact type. For $\tau \in \hat{K}$, let E^τ be the homogeneous vector bundle over G/K associated with τ, and let $C_0^\infty(G,\tau,\tau)$ be the related convolution algebra of *radial systems of sections* of E^τ. Assuming $C_0^\infty(G,\tau,\tau)$ commutative, we use the theory of spherical functions of type τ on G to define a spherical transform for $F \in C_0^\infty(G,\tau,\tau)$. The corresponding inversion formula is obtained by using the Plancherel formula on G. The example of real hyperbolic spaces $H^N(\mathbb{R})$ is discussed. The Plancherel measure is written down explicitly in this case, and the vector bundles of Dirac spinors, symmetric traceless tensors, and p-forms on $H^N(\mathbb{R})$ are considered in detail.

Politecnico di Torino
Corso Duca degli Abruzzi 24
10129 Torino, Italy
Camporesi@polito.it

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