

Spherical Wavelet Transform

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Abstract. In this article we present a group-theoretical approach for the continuous wavelet transform (CWT) on the unit sphere S^{n-1} based on its conformal group, the Lorentz group $\text{Spin}(1, n)$, which is a double covering of the $SO(1, n)$ group. We introduce transformations on the unit sphere from the decomposition of the conformal group into the maximal compact subgroup of rotations $\text{Spin}(n)$ and the set of Möbius transformations of the form $\varphi_a(x) = (x - a)(1 + ax)^{-1}$, where $a \in B^n$ and B^n denote the open unit ball in \mathbb{R}^n . We present a class of local conformal dilatation/ contraction operators on the unit sphere S^{n-1} that allow us to define a family of spherical continuous wavelet transforms from which the CWT defined by J. P. Antoine and P. Vandergheynst is a particular case (see [1] and [2]).

Mathematics Subject Classification (2000). Primary: 30G35, Secondary: 42C40.

Keywords. spherical wavelet transform; spherical dilations, Lorentz group; Möbius transformations; spherical wavelets.

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Received: November 14, 2005

Accepted: July 8, 2006