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*Lie algebra data processing applied to medical images*

We propose to describe and develop a data processing technique that uses a new type of discrete transforms based on the orbit functions of compact Lie groups on the 3-dimensional (3D) case. These discrete orbit-function transforms (DOFT) are, in the particular case of a rectangular lattice of dimension $n = 2$ and of the Lie group $\mathrm{SU}(2) \times \mathrm{SU}(2)$, reduced to the transform known as 2-dimensional (2D) Discrete Cosine Transform Type-I. However, the DOFTs are unique as they are fast and allow processing of images defined on grids in the form lattices of other symmetries. A crucial property of the DOFTs is that it allows construction of continuous functions (trigonometric polynomials) providing continuous extension of the (inverse) transform from the discrete grid points to any point of the surface in between. It was demonstrated that the continuous extensions of DOFTs (CEDOFT) have superior analytic properties, such as convergence, localization, and differentiability of the trigonometric series when compared to other techniques. These properties (fast processing and continuous extension) suggest that these tools are ideal for interpolation processing. The proposal is aimed at using this process to interpolate data extracted from a MRI system. Compared to standard interpolation processes (tricubic, spline, etc.), we increase the quality of the interpolation, and the time computation is faster.