

Compositional distances for DTI Anisotropy Measures

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Abstract

Diffusion tensor imaging (DTI) has become a widely used technique in the investigation of brain structure and function since it allows in vivo measurement of white matter fiber orientation. To interpret this data many different measures of diffusion anisotropy that reduce the tensor information to a scalar value have been proposed. In this contribution, we propose anisotropy measures derived from compositional data. We evaluate them on real data sets and we demonstrate how these distances detect better the transitions between white and grey matter. Moreover, KLA measure shows a better discrimination in areas with great confluence of fibers. This leads KLA to be a good measure for segmenting white from grey matter.

Key Words: anisotropy, compositional data, diffusion tensor imaging, log-ratio analysis.

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