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A Skew-t Space-varying Regression Model for the Spectral Analysis of Magnetoencephalography Readings

Characterizing the brain rhythms of individuals with neurological disorders is of fundamental interest in neuroscience. We develop a Bayesian approach for comparing the resting state brain activity of individuals with Down syndrome (DS) with controls. Magnetoencephalography is used to record time-series of neural activity across several brain regions, and the mean-frequency of the power spectral density is computed at each region. We develop a skew-t model for analysis, and use space-varying regression to examine associations across the scalp. Our analysis suggests spectral slowing in the brain rhythms of individuals with DS, and produces smoothed maps illustrating the scalp-topography of differences.