Abstract of the Dissertation

A comparison of schemes for the numerical approximation of the gyroaveraging operator

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We implement and benchmark a variety of schemes for calculating gyroaverages in the 2D, compactly supported non-periodic setting. Schemes implemented include bilinear spline collocation, bicubic spline collocation, padded (bivariate) FFT interpolation, and bivariate tensor Chebyshev interpolation. In particular we quantify the impact of shared-memory parallelism and the use of GPU accelerators to speed up calculations, as well as the trade-off of accuracy vs computational cost, for both smooth functions and those with singularities.