Sampling for Convolution with Prolates

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During the last years the interest in Finite Fourier Transform (FFT) eigenfunctions, often referred to as 'prolates', has increased significantly among scientists both in the field of quantum chemistry as well as in the signal processing community. These prolates are band-limited and highly concentrated at a finite time-interval. Both features are acquired by the convolution of a band-limited function with a prolate. This will permit the interpolation of such a convolution using the Walter and Shen sampling formula\textsuperscript{1} essentially simplifying the computations\textsuperscript{2}. The Fourier transform of the convolution may not necessarily be continuous and the concentration interval is twice as large as that of the prolate\textsuperscript{3}. Rigorous error estimates are given as dependent on the truncation limit and the accuracy achieved is tested by numerical examples.