

MATH 416, HW 7, FALL 2014

1. a) Propose an example of a function with bandwidth 2, that is such that its Fourier transform is supported on the interval $[-1, 1]$.

b) Provide a graphical representation of your function restricted to the interval $[-512, 512]$ in the original domain, sampling each unit interval 4 times.

c) Provide an approximation to your function using Shannon sampling formula (Theorem 4.9). Compute the errors of approximation using $\| \cdot \|_2$ and $\| \cdot \|_\infty$ norms.

d) Analyze the errors of the above approximation, as you upsample and downsample the signal, each time by the factor of 2.