Homework 10

Due April 4th by the beginning of class.

Problem: Calculate the Fourier transform of $1_{(-1,1)}$ (this is the function $\mathbb{R} \to \{0,1\}$ which is 1 on $(-1,1)$ and 0 elsewhere) and use this result to calculate the Fourier transform of $x^k \sin x$ where $k \in \{-1, 0, 1, \dots\}$.

Hint: For the first part use [FrJo, (8.1.1)], and for the second get the $k = -1$ case from the Fourier inversion formula for distributions, and for the other values of k use [FrJo, (8.3.8)].

Solution:

References

[FrJo] G. Friedlander and M. Joshi. The Theory of Distributions, second edition, Cambridge University Press, 1998.