

CAAM 499 HW 5. DUE BY 11AM MONDAY 10/23

Textbook exercises in chapter 4:

Exercise 1

Exercise 3 (Hint: Try writing $f(x) = \int_0^\infty g(s)e^{-s(1+|x|^2)}ds$ and do a substitution $\tilde{s} = s(1 + |x|^2)$. Now pick your g carefully like in class.)

Exercise 4 (Hint: Think of using Heaviside function)

Exercise 10 (Hint: We already computed this in class so you know what the answer should be. Also, part of the calculation in class is exactly what you need to do this computation)

Exercise 11 (Hint: Try using our class computation for $\mathcal{F}1_{(-a,a)}$. The Plancherel formula is $\int |f(x)|^2 dx = \frac{1}{2\pi} \int |\hat{f}(\xi)|^2 d\xi$)

Exercise 14 You may ignore the second part of the question, but I would give points for it as a bonus. (Hint: Try $k = 0$ and $k = 1$ first. Notice that $\partial_\xi \int_0^\infty e^{ix\xi} f(x) dx = \int_0^\infty e^{ix\xi} ix f(x) dx$.)