

CAAM 499 HW 4. DUE BY 11AM MONDAY 10/9

Textbook exercises in chapter 4:

Exercise 2 (Hint: Remember that all properties of Fourier transform carry over to \mathcal{S}' . Use the table! Also use result of the computation of $\mathcal{F}(|x|^\alpha)$ done on page 51. We'll do it in class ourselves soon)

Exercise 6

Also compute the Fourier transform of $\left(\frac{d}{dx}\right)^k \delta$ for $\delta \in \mathcal{S}'(\mathbb{R}^1)$ the delta distribution, and k a positive integer. Remember that all properties of Fourier transform carry over to \mathcal{S}' .

Exercise 7 (Hint: Use the change of variables formula and the definition of d_r for distributions you defined on last week's hw. Remember that $f \in \mathcal{S}'(\mathbb{R}^n)$ and *not* necessarily given by an integral. *You should not write down any integrals except for the fourier transform of a test function!*

Exercise 8 (Hint: This follows directly from the previous problem. Set $r = 1/\tilde{r}$ in exercise 7 and it will give you a formula for $d_{\tilde{r}}\mathcal{F}f$. All you have left to do is remember what it means for a distribution to be homogeneous of degree t . If you pretend f is an actual function (which you are not allowed to do), this result follows easily be the change of variables formula. The point is that all properties we like about functions carry to distributions!)