

Homework 1:

Problem 1.1:

Compute

$$\left(\frac{1}{\pi} \text{p.v.} \frac{1}{x}\right)^\wedge(\xi) = -i \text{sgn}(\xi)$$

in the sense of tempered distribution where  $\text{sgn}(\xi) = 1$ , if  $x > 0$ ;  $= 0$ , if  $x = 0$ ;  $= -1$ , if  $x < 0$ .

Problem 1.2:

If  $f = 1_{[0,1]}$ , show that  $Hf \notin L^1$  and  $Hf \notin L^\infty$ .