18.104
Spring 2013

Homework 9

Due March 14th by the beginning of class.

Problem: Let $a > 0$ and let $1_{(0,a)} \colon \mathbb{R} \to \{0, 1\}$ be the characteristic function of $(0, a)$; this is the function which is 1 on $(0, a)$ and 0 elsewhere. Find $u_a \in \mathscr{D}'(\mathbb{R})$ such that supp $u_a \subset [0, \infty)$ and $1_{(0,a)} * u_a = \delta$.

Hint: Try $u_a = \sum_{k=0}^{\infty} \partial\delta_{ka}$. Use the results of [FrJo, page 52] to simplify $1_{(0,a)} * u_a$ (justifying carefully the interchange of sum and convolution).

Solution:

References

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