MATH 9312 SUMMER 2013

HOMEWORK ASSIGNMENT 2. DUE MAY 28.

2.1. Let f and g be two different function in $C(\Omega)$. Show that they also differ as distributions.

2.2. Prove that if a test function ϕ vanishes in a neighbourhood of the support of a distribution f, then $\langle f, \phi \rangle = 0$. Would it suffice if ϕ vanishes on the support of f?

2.3. Prove that every distribution is the limit of a sequence of distributions with compact support.

2.4. Find a distribution $f \in \mathcal{D}'(\mathbb{R})$ such that $f'' = \delta_0$ in $\mathcal{D}'(\mathbb{R})$.

2.5. Evaluate $\Delta(1/r^2)$ in $\mathbb{R}^3$, where $r = |x| = \sqrt{x_1^2 + x_2^2 + x_3^2}$.