

Partial Differential Equations

Homework 1

due February 14, 2007

1. State, for each of the nonlinear PDEs on page 5 of Evans' book, the order of the equation and whether the equation is semilinear or quasilinear.
2. Evans, p. 85 problem 1
3. Evans, p. 85 problem 2
4. In the proof of the theorem on the solution of Poisson's equation we have used that

$$D \int_{\mathbb{R}^n} \Phi(y) f(x - y) dy = \int_{\mathbb{R}^n} \Phi(y) Df(x - y) dy.$$

State why and precisely under which assumptions this manipulation is permitted.