

Partial Differential Equations

Homework 3

Due on March 13

1. Consider the initial value problem for the inviscid Burgers equation given by

$$\begin{cases} u_t + uu_x = 0 \\ u(x, 0) = h(x) \end{cases},$$

where the initial data is given by the discontinuous function

$$h(x) = \begin{cases} 2, & x < 0, \\ 1, & x > 0. \end{cases}$$

- (a) Compute the characteristics of this problem.
- (b) Write an explicit expression for a weak solution to this problem.