CS555.

Questions.

(1) Can you write the following in conservation form?

$$u_t + x\, u_x = 0$$

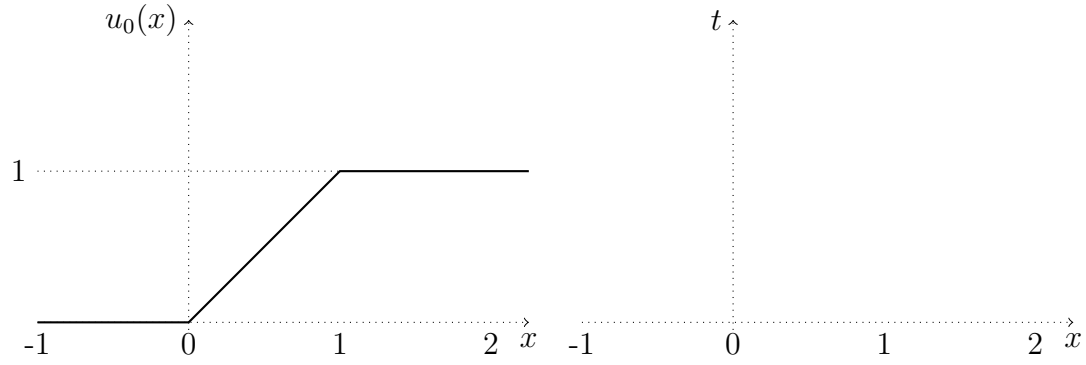
(2) Can you write the following in conservation form (note 2D)?

$$u_t + y\, u_x - x\, u_y = 0$$

(3) Consider Burger's equation:

$$u_t + uu_x = 0$$

with initial value:

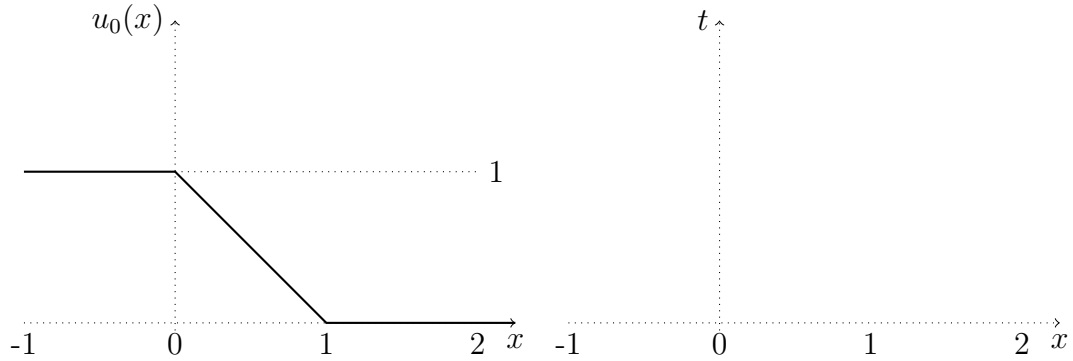


Draw the characteristic lines. Interpret the behavior.

(4) Consider Burger's equation:

$$u_t + uu_x = 0$$

with initial value:



Draw the characteristic lines. Interpret the behavior.

(5) Consider the Riemann Problem

$$u(x,0) = \begin{cases} 5 & x \leq 0 \\ 1 & x > 0 \end{cases}$$

for the Burgers equation: $u_t + (f(u))_x = 0$. What is the shock speed?

(6) Consider the Riemann Problem

$$u(x,0) = \begin{cases} 3 & x \leq 0 \\ -1 & x > 0 \end{cases}$$

for the Burgers equation: $u_t + (f(u))_x = 0$. What is the shock speed?

(7) Consider the Riemann Problem

$$u(x,0) = \begin{cases} 2 & x \leq 0 \\ 8 & x > 0 \end{cases}$$

for the Burgers equation: $u_t + (f(u))_x = 0$. What is the shock speed?