HW2

March 30, 2007

1. Solve $u_t + u_x = 0$ at $t = 2, 4, 6, 8, -1 \le x \le 1$, periodic boundary conditions, with initial data:

$$u(x,0) = \sin(\pi x)$$

- (a) 1st Order Upwind
- (b) Lax-Friedrichs
- (c) 2st Order Upwind
- (d) Lax-Wendroff
- (e) ENO

2. Solve $u_t + u_x = 0$ at $t = 0.2, 0.4, 0.6, 0.8, -1 \le x \le 1$, u(1, t) = -1 and u(-1, t) = 1, with initial data:

$$u(x,0) = \begin{cases} -1 & \text{for } x \ge 0\\ 1 & \text{for } x < 0 \end{cases}$$

- (a) 1st Order Upwind
- (b) Lax-Friedrichs
- (c) 2st Order Upwind
- (d) Lax-Wendroff

(e) ENO

3. Ex 3.1,3.2,3.3,3.4,3.5 in the book