Homework 11 – MATH 5602

April 3, 2013

1. Consider the equation

$$u_t + (\frac{u^2}{2})_x = 0, \quad 0 \le x \le 2\pi,$$

with periodic boundary condition and initial condition $u(x, 0) = \sin x + 2$. Test the order of accuracy for T = 0.2 for the following two schemes:

- a. $\frac{u_j^{n+1}-u_j^n}{\Delta t} + u_j \frac{u_j^n-u_{j-1}^n}{\Delta x} = 0.$ (this is a non-conservative scheme)
- b. Lax-Friedrichs scheme.