

Math 243A, Homework # 2, Due 9/20/2012

1. Show that the following scheme is consistent with $u_t + au_x = 0$.

$$\frac{v_m^{n+1} - v_m^n}{k} + \frac{a}{2} \left(\frac{v_{m+1}^{n+1} - v_m^{n+1}}{h} + \frac{v_m^n - v_{m-1}^n}{h} \right) = 0.$$

2. Show that the scheme

$$\frac{v_m^{n+1} - v_m^n}{k} + a \frac{v_{m+2}^n - 3v_{m+1}^n + 3v_m^n - v_{m-1}^n}{h^3} = 0$$

is consistent with $u_t + au_{xxx} = 0$.