

Math 950 Homework 6 Due 04/23/09

Prob 1 (5pt). (Modified equation for Beam-Warming)

Show that the Beam-Warming method (10.26) is second order accurate on the advection equation and also derive the modified equation (10.47) on which it is third order accurate.

Prob 2 (5pt). (Two-dimensional Lax-Wendroff)

- (a) Derive the two-dimensional Lax-Wendroff method from (11.6) by using standard centered approximations to u_x , u_y , u_{xx} and u_{yy} and the approximation

$$u_{xy}(x_i, y_j) \approx \frac{1}{4h^2} [(U_{i+1,j+1} - U_{i-1,j+1}) - (U_{i+1,j-1} - U_{i-1,j-1})]. \quad (1)$$

- (b) Compute the leading term of the truncation error to show that this method is second order accurate.