

# MATH 568 – Homework #3

due 4 October 2006

- 1) Let's prove the pertinent results stated in Section 2.12 of the text (pp. 38-39):
  - a) Prove the truncation error of the scheme (2.98) is indeed  $O((\Delta x)^2 + (\Delta t)^2)$ .
  - b) Prove that (2.99) holds.
  - c) Prove that (2.100) holds and thus we obtain a value of  $\lambda$  whose magnitude is greater than unity.
  - d) Prove that the scheme (2.101) has both solution modes satisfying  $|\lambda| \leq 1$  with the given restrictions on  $\theta$  and  $\mu$ .
- 2) With respect to the approximation of the boundary condition given in (2.114):
  - a) Prove that the truncation error is as in (2.116).
  - b) Prove that the maximum principle can be applied to (2.117), given the condition (2.118).