

CSE/Mathematics 451
Homework Six

Due 14 December 2007– No late assignments

1. Problem 7,p.178
2. Problem 7,p.185
3. Problem 8,p.193
4. Problem 9,p.193
5. Problem 2,p.198
6. Problem 3,p.198
7. Consider the model equation

$$\begin{aligned}x'(t) &= \lambda x(t) \\x(0) &= x_0\end{aligned}$$

where $\lambda < 0$ (and, for simplicity, real). Suppose that we use the trapezoid rule

$$x_{n+1} = x_n + \frac{h}{2}[f_n + f_{n+1}]$$

to solve this equation. Show that

$$x_n = \left(\frac{1 + h\lambda/2}{1 - h\lambda/2} \right)^n x_0$$

and for fixed h , we have

$$\lim_{n \rightarrow \infty} x_n = 0.$$