

AMS 326 - Homework #4

Due Thursday, October 26, 2006

1. (5 points) Implement the secant method. Test your program by finding a root of $f(x) = x - x^{1/3} - 2$ on $[2, 4]$. What happens if 10 iterations are performed? Replace the formula in the secant algorithm with

$$x_{k+1} = x_k - f(x_k) \left(\frac{x_k - x_{k-1}}{f(x_k) - f(x_{k-1}) + \epsilon} \right),$$

where ϵ is a small number on the order of ϵ_m . How and why does this change the results?

2. (5 points) It can be shown that if equal monthly deposits of PMT dollars are made into annuity (interest-bearing account) that pays annual interest r compounded monthly, then the value $A(n)$ of the account after n years will be given by the formula

$$A(n) = PMT \frac{(1 + r/12)^{12n} - 1}{r/12}.$$

Suppose Mr. Jones is 30 years old and can afford monthly payments of \$350.00 into such annuity. Mr. Jones would like to plan to be able to retire at age 65 with \$1 million nest egg. Use the bisection method to find the interest rate r Mr. Jones will need to shop for in order to reach his retirement goal.