Worksheet 11: **Wednesday October 2**

SUMMARY Introduction to False Position (Regula Falsi)
READING Recktenwald, 6.1.1 (240-250)

GROUPWORK
In the NMM Toolbox, we have an implementation of the bisection algorithm in **bisect.m**.

Recall we have a function m-file `sphere.m` which implements $f(d) = 2552 - 30d^2 + d^3$. Find the roots of $f(d)$.

Implementation Log
Write down what steps you had to take in order to use bisect.m to solve the equation $2552 - 30d^2 + d^3 = 0$

$d =$
Assessing Bisection
What are some good features of the bisection algorithm?

What are some drawbacks to the bisection algorithm?

False Position Method (Regula Falsi)
The method of False Position is another ancient method of computing the solution of equations of one variable. It is very similar to the bisection method in that it too is a bracketing method, except that False Position uses the **value** of the function at the end points to help determine where the next bracket occurs. Draw a line connecting $(a, f(a)$ and $(b, f(b))$ and the new bracket will be formed using the x-intercept of this line.

Sketch a picture of the iterative process of the **False Position** algorithm, below:

False Position visually
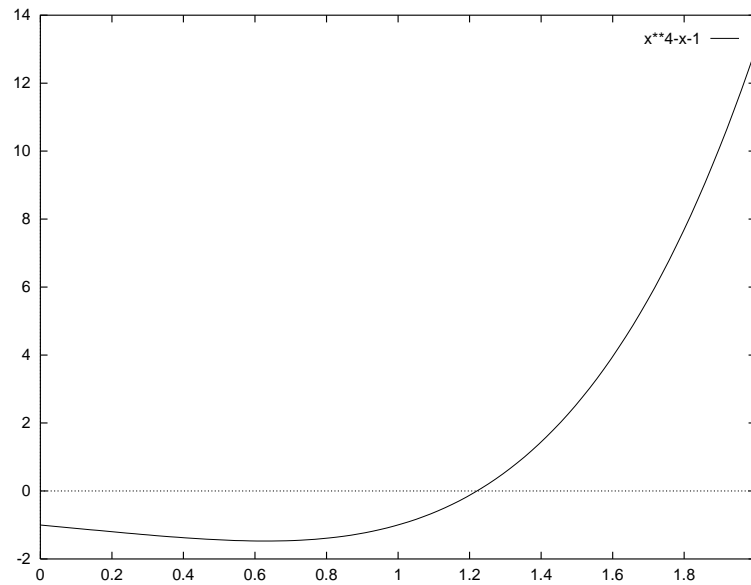
Exercise

Let's try and derive the iterative step used in the False Position algorithm.

If we have a bracket $[a_n, b_n]$ how do we find the value p_n which is the next estimate of the root?

False Position Algorithm

Example

Use False Position to solve the same equation $f(d) = 2552 - 30d^2 + d^3 = 0$ you previously solved using Bisection and see if there is a difference in the number of steps False Position takes to converge versus Bisection. In s:\Math Courses\Math370\Fall2002\rootfind there is an implementation of the False Position algorithm in MATLAB . Can you see the similarities to the Bisection Algorithm?

Assessing False Position

What are some good features of the false position algorithm?

What are some drawbacks to the false position algorithm?