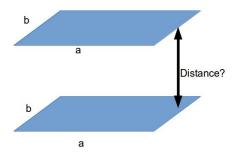# Numerical Methods
MAT/CSC 381
Project 2

Write MATLAB functions to implement the bisection algorithm and secant algorithm for finding the solution to the problem below. Provide a graph of the equation to illustrate f(x) = 0. Use intervals (0.1, 4.0), (0.3, 8.0) and converge to a tolerance of 1.0e-12.

For each interval determine the bound for number of iterations of the bisection algorithm to ensure the tolerance of 1.0e-12.

Illustrate mathematically the single-precision round-off error between the two midpoint calculations provided on page 37 (section 2.2).

Problem:
Determine that distance (c) between two 1mx1m plates so that the each plate fills exactly half (50%) of the viewing area of each other.

Let X and Y be defined as:

$$X = a/c$$
$$Y = b/c$$

The view factor between the plates is defined as:

$$F(a,b,c) = \frac{2}{\pi XY}[A+B+C]$$

and A,B,C are defined as:

$$A = \ln\left(\frac{(1+X^2)(1+Y^2)}{1+X^2+Y^2}\right)^2$$

$$B = X\sqrt{1+Y^2}\arctan\left(\frac{X}{\sqrt{1+Y^2}}\right) - X\arctan(X)$$

$$C = Y\sqrt{1+X^2}\arctan\left(\frac{Y}{\sqrt{1+X^2}}\right) - Y\arctan(Y)$$

For this assignment, $a = 1$ and $b = 1$ and you will be find the distance (c) by solving the following:
$$F(a,b,c) - 0.5 = 0 \quad.$$