

Homework 2- Method of Bisection.

Write a small code using this method that systematically reduces the interval of uncertainty by function comparison to find zeroes of the parabola:

$$f(x) = x^2 - 4$$

for 2 initial intervals

$$[-4., 0.]$$

$$[+5.0, 0.]$$

for small tolerance:

$$|a - b| < \varepsilon$$

$$\varepsilon = 10^{-3}$$

You evaluate f at midpoint of the interval and always create a new interval of uncertainty by discarding the value of a or b depending on whether $f(a)$ or $f(b)$ agrees in sign with f at the midpoint of the interval.

Show that you obtain the 2 zero crossings of the parabola at $+2.0$ and -2.0 respectively.

Estimate the number of iterations necessary to attain given accuracy using number of function evaluations:

$$\log_2((b - a) / \varepsilon)$$