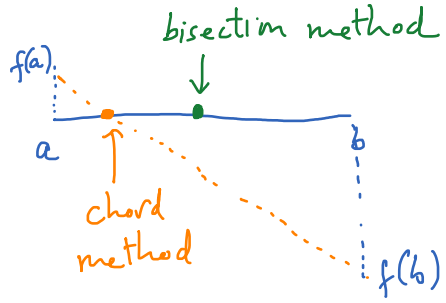
Lecture 3

Wednesday, January 14, 2026 11:57 AM

Chord method (also known as *false position method* or *linear interpolation method*) is an modification of the bisection method.



For the bisection method, you narrow the search interval by half, regardless of the "size" of $f(a)$ and $f(b)$. So the interval $[a, b]$ will be replaced by either $\left[a, \frac{a+b}{2}\right]$ or $\left[\frac{a+b}{2}, b\right]$. For the chord method, you replace the interval $[a, b]$ by either $[a, c]$ or $[c, b]$ where c is the intersection between the line passing through $(a, f(a))$ and $(b, f(b))$ and the x-axis. You can compute explicitly that

$$c = \frac{af(b) - bf(a)}{f(b) - f(a)}$$

chord.mlx ×

/MATLAB Drive/chord.mlx

Experiment with Chord Method. We are solving the cubic equation

$$x^3 - 3x + 1 = 0$$

We want the solution between 1 and 2.

```
a = 1; b= 2;
for k = 1:10
    c = (a*f(b)-b*f(a))/(f(b)-f(a));
    if f(a)*f(c) < 0
        b = c;
    else
        a = c;
    end
    c
end
```

Define the function f

```
function y = f(x)
    y = x^3 - 3*x + 1;
end
```