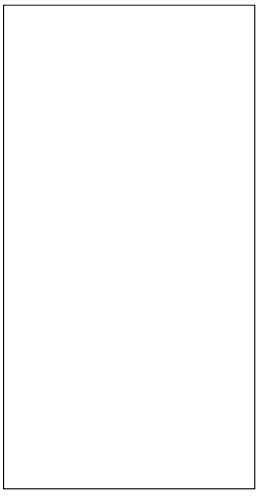
Readings: Chapter 6

BRACKETING VS OPEN METHODS



FIXED-POINT ITERATION

Transform equation to: $x = g(x)$

$e^{-x} - x = 0$

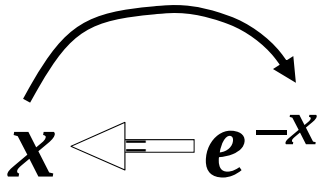
$\Downarrow$

$x = e^{-x}$

$\sin x = 0$

$\Downarrow$

$x = x + \sin x$



FIXED-POINT ITERATION

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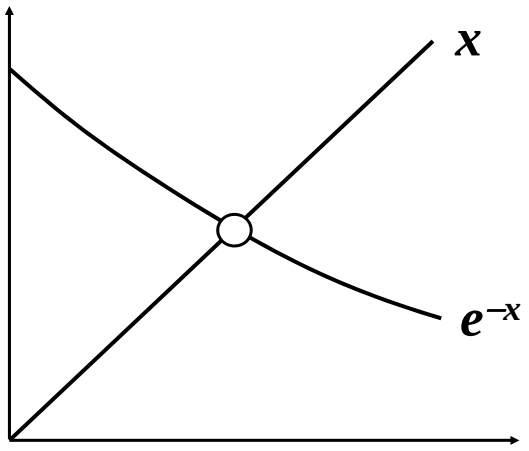
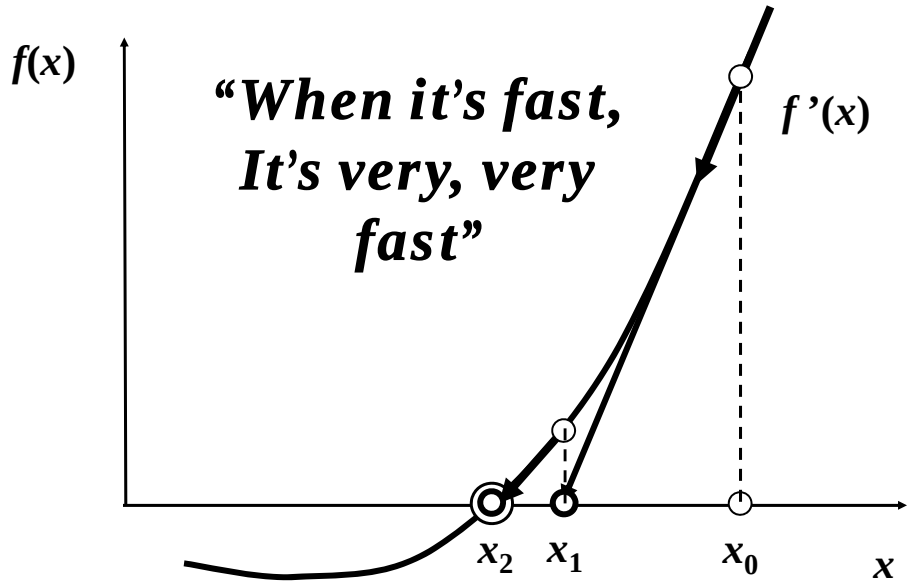


HOW FIXED-POINT ITERATION CAN FAIL

$$E_{i+1} = g'(\xi)\, E_i$$

NEWTON-RAPHSON



NEWTON-RAPHSON METHOD

$$f'(x_i) = \frac{f(x_i) - 0}{x_i - x_{i+1}}$$

HOW NEWTON-RAPHSON CAN FAIL

ERROR ANALYSIS

FIXED POINT

$$E_{i+1} = g'(\xi)\, E_i$$

NEWTON-RAPHSON ALGORITHM

- newtonRaph.m

SECANT METHOD

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

$$f'(x_i) \cong \frac{f(x_{i-1}) - f(x_i)}{x_{i-1} - x_i}$$

FALSE POSITION VS SECANT

MODIFIED SECANT METHOD

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

$$f'(x_i) \cong \frac{f(x_i + \delta x_i) - f(x_i)}{\delta x_i}$$

Generally faster than secant