Numerical Analysis

<Home Assignment #1>

(Deadline: April 17, 2024)

Figure 1 shows a uniform beam subject to a linearly increasing distributed load. The equation for the resulting elastic curve is

$$y = \frac{w_0}{120EIL}(-x^5 + 2L^2x^3 - L^4x) \qquad (\mathbf{1})$$

Use following root finding methods to determine the point of maximum deflection (i.e., the value of x where dy/dx = 0). Then substitute this value into **Eq. (1)** to determine the value of the maximum deflection. Use the following parameter values in your computation: L = 600 cm, E = 50,000 kN/cm^2, I = 30,000 cm^4, and w_0 = 2.5 kN/cm.

A) Bracketing method

Problem A1: Use the **bisection** method to determine the point of maximum deflection.

B) Open method

Problem B1: Use the **Newton Raphson** method to determine the point of maximum deflection.

Problem B2: Use the **secant** method to determine the point of maximum deflection.

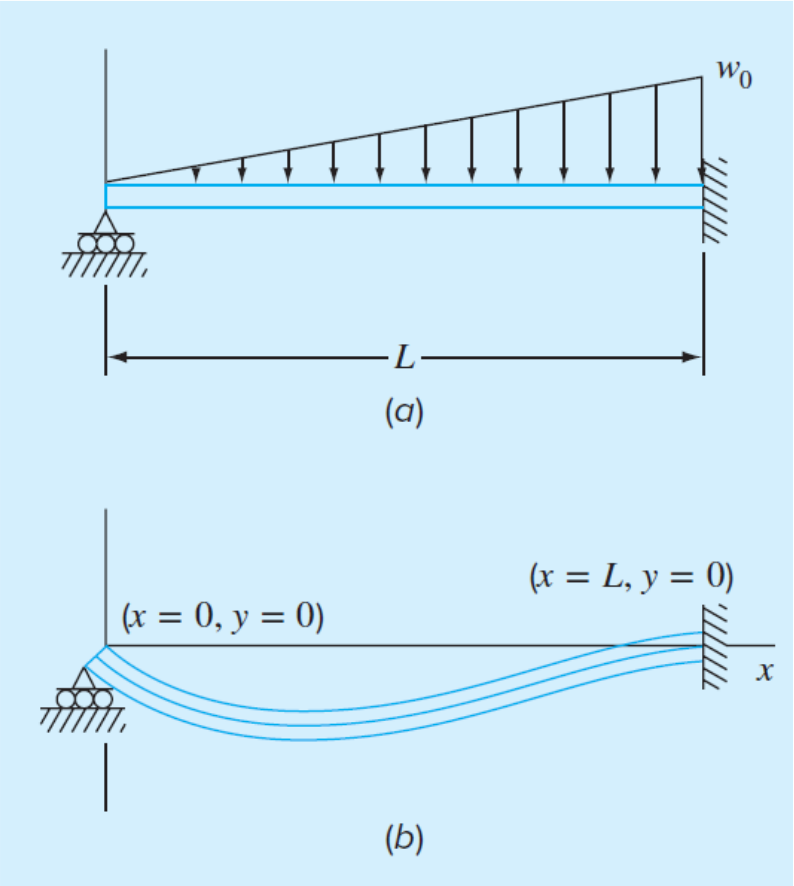

Figure 1