ENG202: Numerical Methods for Engineering
Lab. Assignment 1 (A1)
Week 9, Spring 2020

Note:

- Each student has to implement **2** exercises specified in the manual.
- Project folder nomenclature: A1_*yourname_yourID*
- Create a new file for each programming exercise and name it as Exercise*X*, where *X* denotes the exercise number.
- Zip your project folder and upload it to your Moodle account before the end of the lab session.
- Any queries during the lab hours should be discussed only with the Instructor/T.A.s.
- Each implementation should be done individually. Sharing your code (in entirety or partially) will be considered as plagiarism.

***Exercise 1*:** The deflection of a uniform beam subject to a linearly increasing distributed load can be computed as

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

Given that L = 600 cm, E = 50,000 kN/cm2, I= 30,000 cm4, and w0 = 2.5 kN/cm, write a program to determine the point of maximum deflection using the golden-section search until the approximate error falls below εs = 1% with initial guesses of xl = 0 and xu = L.

***Exercise 2*:** Andrade's equation has been proposed as a model of the effect of temperature on viscosity:

$$\mu = De^{B/T_a}$$

where μ = dynamic viscosity of water (10^{-3} N·s/m2), Ta = absolute temperature (K), and D and B are parameters. Write a program to fit this model to the following data for water:

T	0	5	10	20	30	40
μ	1.787	1.519	1.307	1.002	0.7975	0.6529

Plot the above data points and also the fitted curve.