ENGR 1181 Class 6: Data Analysis

After Class Assignment

Instructions
Use this reference information to complete the provided Excel spreadsheet. You will need to calculate the vertical deflection for the beam under the two types of loads. Then, create a graph of the results that displays both data sets on one scatter plot with smooth lines. Be sure to use good graphing practices! Print your spreadsheet on one page in portrait orientation.

Reference Information
The vertical deflection of a cantilever beam depends on the type of applied load, the beam length, the elastic modulus of the material \((E)\), and the area moment of inertia \((I)\). The vertical deflection \((y)\) is measured in inches. The vertical deflection for two different types of loads can be written in terms of the distance \(x\) from the fixed end \(A\) as given by equations 1 and 2 below. The distance \(x\) is measured in inches, and the constants \(C_1\) and \(C_2\) contain information pertaining to the type of load, the length, \(E\), and \(I\).

Deflection Equation for Concentrated Load: \[ y_1(x) = C_1 x^3 (30 - x) \]

Deflection Equation for Distributed Load: \[ y_2(x) = C_2 x^5 \]

Constant \(C_1\): 4.55E-05

Constant \(C_2\): 8.55E-06