Homework 03 – Slope Deflection Analysis

Required:

Using the slope deflection method solve the following problems (Leet & Uang, “Fundamentals of Structural Analysis”, 2nd Edition, 2005); In all answer you must evaluate and display (i): reactions; (ii) shear force diagram; (iii) moment diagram and (iv) “estimated” (not calculated) deflection lines consistent with the previous diagrams.

Notes:

- Please organize the submittal in two columns: a) One column for all diagrams, sketches, drawings and b) Second column hand calculations, notes, etc.

1) Problem P12.4 (20pts)

P12.4. Analyze the beam in Figure P12.4 by slope-deflection and draw the shear and moment diagrams for the beam. EI is constant.
2) Problem 12.7 (20 pts)

P12.7 Analyze the frame in Fig. P12.7 by slope deflection and draw the shear and moment diagrams for the frame.

3) Problem P12.10 (20 pts)

P12.10. In Figure P12.10, support A rotates 0.002 rad and support C settles 0.6 in. Draw the shear and moment curves. Given: \( I = 144 \text{ in}^4 \) and \( E = 29,000 \text{ kips/in}^2 \).
4) Problem P12.18 (20 pts)

P12.18. Analyze the structure in Figure P12.18. In addition to the applied load, support A rotates clockwise by 0.005 rad. Also $E = 200$ GPa and $I = 25 \times 10^6$ mm$^4$ for all members. Fixed end at A.

![Diagram of P12.18]

5) Problem P12.25 (20 pts)

P12.25. Determine all reactions at points A and D in Figure P12.25. $EI$ is constant.

![Diagram of P12.25]