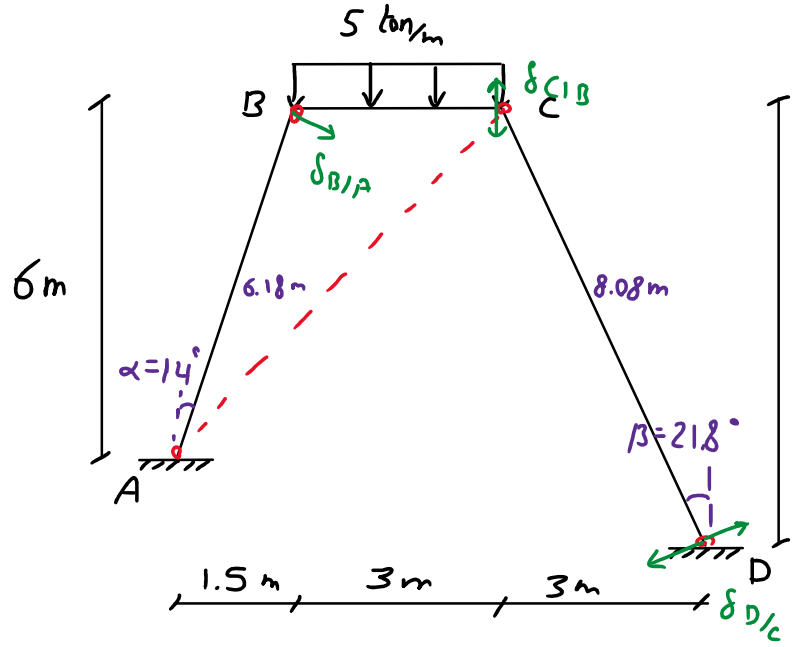
Slope-Deflection 8

Thursday, March 14, 2024 14:17

مثال: مطلوب است تشکیل دستگاه معادلات جهت تحلیل سازه به روش شیب - افت.



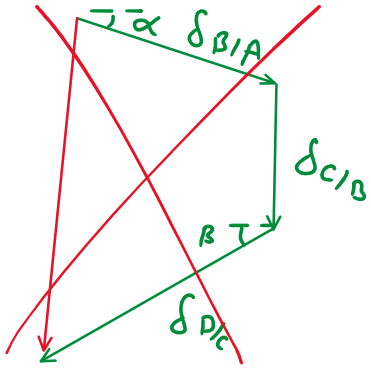
مجهول: θ_B , θ_C , Δ

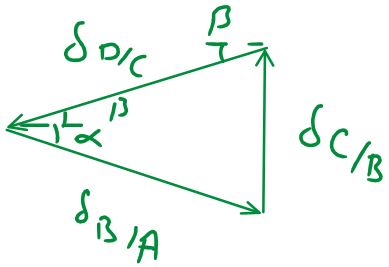
معادله: $\sum M_B = 0$

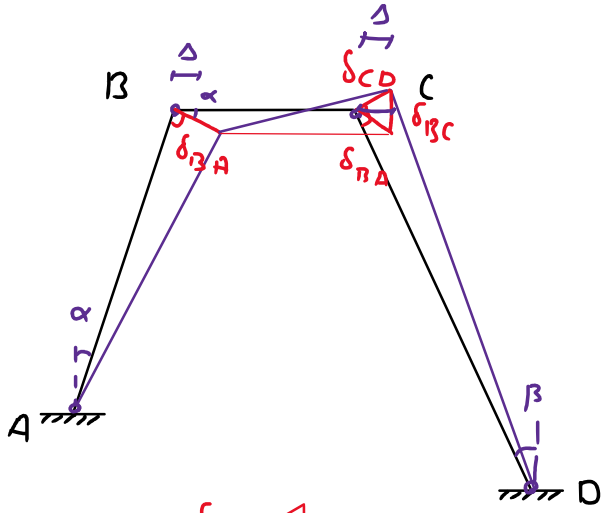
$\sum M_C = 0$

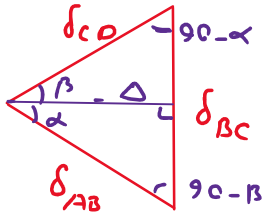
معادله برش روستیر BC

$$\delta_D = \delta_A + \delta_{B/A} + \delta_{C/B} + \delta_{D/C}$$









$$\delta_{CD} = \frac{\Delta}{\cos\beta} = 1.08\,\Delta$$

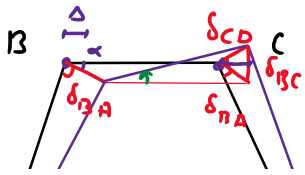
$$\delta_{AB} = \frac{\Delta}{\cos\alpha} = 1.03\,\Delta$$

$$\delta_{BC} = \Delta(\tan\alpha + \tan\beta) = 0.65\,\Delta$$

$$\frac{\delta_{BC}}{\sin(\alpha+\beta)} = \frac{\delta_{CD}}{\sin(90-\beta)} = \frac{\delta_{AB}}{\sin(90-\alpha)}$$

$$M_{AB} = \frac{2EI}{6.18}\left(\theta_B - 3\,\frac{1.03\,\Delta}{6.18}\right)$$

$$M_{BA} = \frac{2EI}{6.18}\left(2\theta_B - 3\,\frac{1.03\,\Delta}{6.18}\right)$$



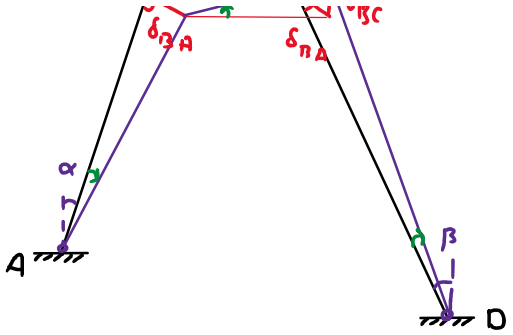
$$M_{BA} = \frac{2EI}{6.18}\left(2\theta_B - 3\,\frac{1.03\Delta}{6.18}\right)$$

$$M_{BC} = \frac{2EI}{3}\left(2\theta_B + \theta_C + 3\,\frac{0.65\Delta}{3}\right) - \frac{5\times 3^2}{12}$$

$$M_{CB} = \frac{2EI}{3}\left(2\theta_C + \theta_B + 3\,\frac{0.65\Delta}{3}\right) + \frac{5\times 3^2}{12}$$

$$M_{CD} = \frac{2EI}{8.08}\left(2\theta_C - 3\,\frac{1.08\Delta}{8.08}\right)$$

$$M_{DC} = \frac{2EI}{8.08}\left(\theta_C - 3\,\frac{1.08\Delta}{8.08}\right)$$



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① $M_{BA} + M_{BC} = 0$

② $M_{CD} + M_{CB} = 0$

③ $0.77M_{AB} + 1.77M_{BA} + 1.62M_{CD} + 0.62M_D - 5.25 = 0$

$+\circlearrowleft \Sigma M_o = 0$

$M_{BA} + M_{CD} + 4.75V_1 + 4.98V_2 - 15\times 0.35 = 0$