



Assume

$$\bar{\sigma} = 100$$

$$K_A = 0.3$$

$$K_P = 3.0$$

SSP wile

$$\sum M_o = 0$$

$$\frac{1}{2} D \times 300D \times \frac{D}{3} = \frac{1}{2} (D+10) \times 100 \times 0.3 \times (D+10) \times \left(\frac{D+10}{3}\right)$$

$$50D^3 = 5(D+10)^3$$

$$50D^3 = 5(D^3 + 30D^2 + 300D + 1000)$$

$$50D^3 = 5D^3 + 150D^2 + 1500D + 5000$$

$$45D^3 - 150D^2 - 1500D + 5000 = 0$$

$$D = 8.66225'$$

Cubic
Equation