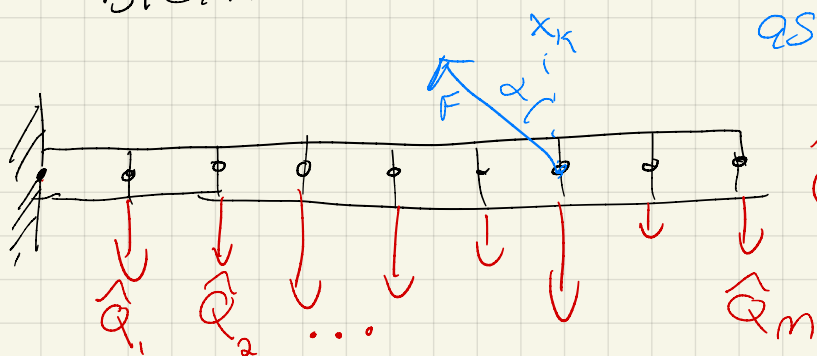


$$M(x) = -\int_x^l q(z) \cdot (z-x) dz + \begin{cases} F \cos(\alpha) (d-x) ; & \text{if } x \leq d \\ 0 ; & \text{if } x > d \end{cases}$$

Break beam into m nodes

assume F acts at one node: x_k



$$\hat{Q}_i = \int_{x_{i-1}}^{x_i} q(x) dx$$

Note: $Q_0 = 0$

$$M(x_n) = -\sum_{i=n}^{m-1} \left[\left(\hat{Q}_i (x_{i+1} - x_n) + \hat{Q}_{i+1} (x_{i+1} - x_n) \right) \left(\frac{1}{2} \right) \underbrace{(x_{i+1} - x_i)}_{dz} \right]$$

$q(z)(z-x)$ via trapezoidal rule

$$+ \begin{cases} F \cos(\alpha) (x_k - x_n) ; & \text{if } x_n \leq x_k \\ 0 ; & \text{if } x_n > x_k \end{cases}$$