University of Maryland Fall 2018

ENCE353: Introduction to Structural Analysis

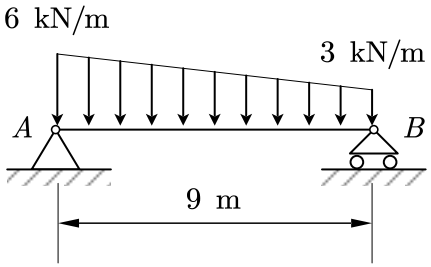
In-Class Problems #1

1. What does it mean for a structure to be considered *statically determinate / indeterminate?*

Statically determinate: All reactions and internal forces in the structure can be determined from equilibrium equations.

Statically indeterminate: More known reactions and internal forces than equilibrium.

2. Calculate the reactions for the following structures

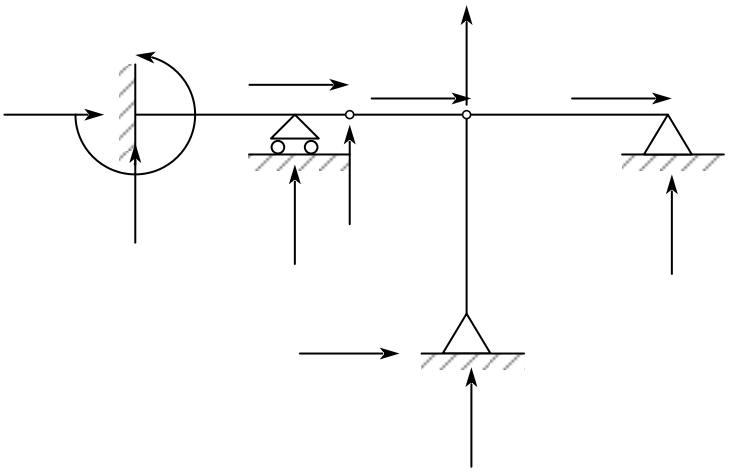


$$\sum F_x = 0,\ H_A = 0$$

$$\sum M_A = 0,\ V_B \cdot 9 = 3\times 9\times \frac{9}{2} + 3\times 9\times \frac{1}{2}\times \frac{1}{3}\times 9,\ V_B = 18\ kN$$

$$\sum F_y = 0,\ V_A = 3\times 9 + 3\times 9\times \frac{1}{2} - 18 = 22.50\ kN$$

3. Classify the structure as statically determinate, statically indeterminate, or unstable



Reactions (r) =3+1+2+2+2+2=12

Members (n) =4

r=12 = 3n=12 =====>statically determinate (and stable).