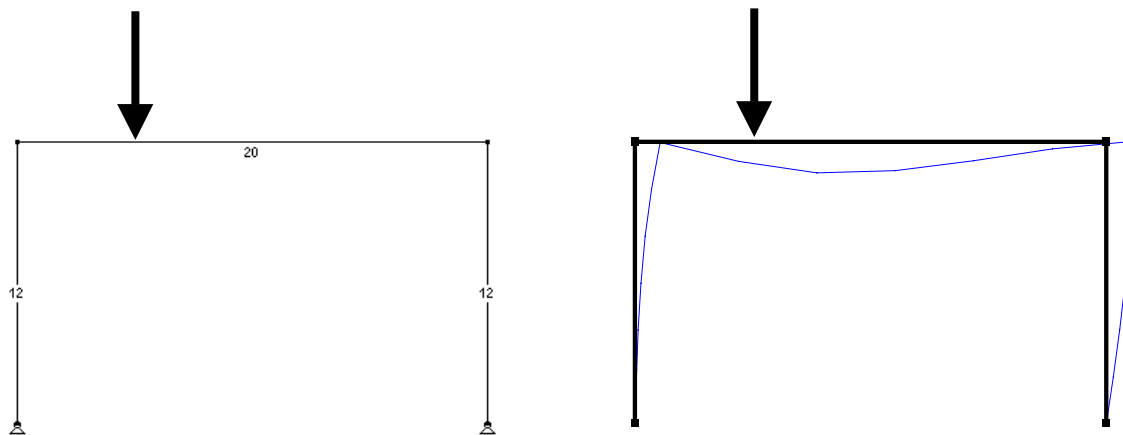


Frames

Problem No. 1

Draw the approximate deflected shape of the frame shown below. The point load acts at 5 ft from the left.



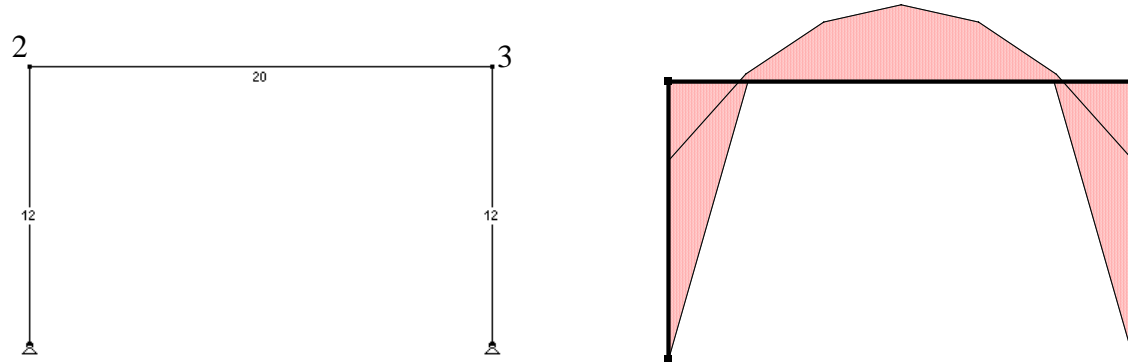
Problem No. 2

The bending moments at the joints of the frame shown below (dimensions shown in feet), subject to a 1 kip/ft uniform load along the beam, are as follows:

$$M_2 = -23.78 \text{ kip-ft}$$

$$M_3 = -23.78 \text{ kip-ft}$$

Please draw the approximate bending moment diagram of the frame.

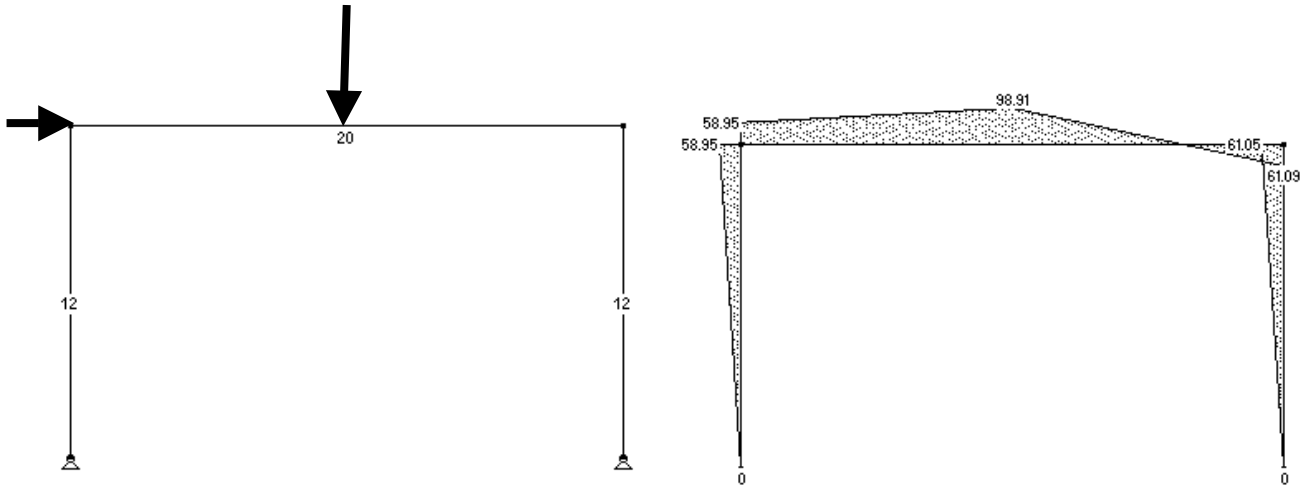


Problem No. 3

The frame shown below is subject to a single point load of 20 kip at the middle of the beam and a horizontal force of 10 kip acting on the left joint. The reactions at the supports are as follows:

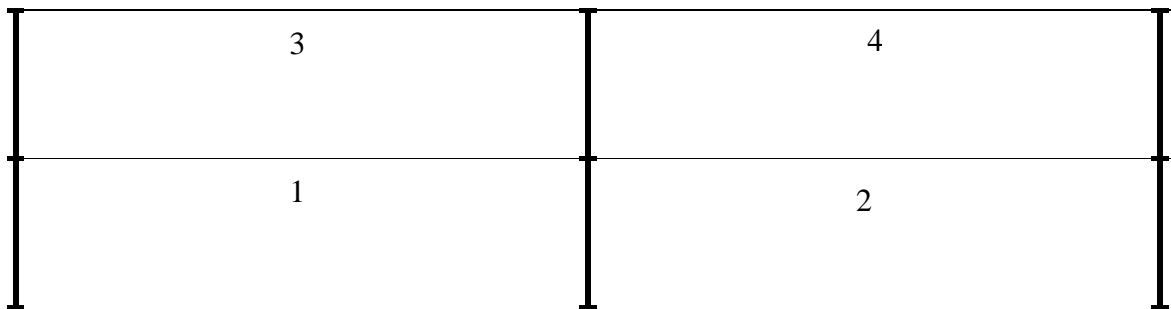
- $V_{\text{left}}=4$ kip (vertical component of the reaction)
- $H_{\text{left}}=-5$ kip (horizontal component of the reaction)
- $V_{\text{right}}=16$ kip
- $H_{\text{right}}=-5$ kip

Please draw the bending moment diagram of the frame.



Problem No. 4

What are the loading conditions that you should consider for the design of the frame shown below, subject to a uniform live load?



Max moments at mid-spans:

case 1: load 1 and 4 (will also give max moment at the left joint of span 1 and the right joint of span 4)

case 2: load 2 and 3 (will also give max moment at the left joint of span 3 and the right joint of span 2)

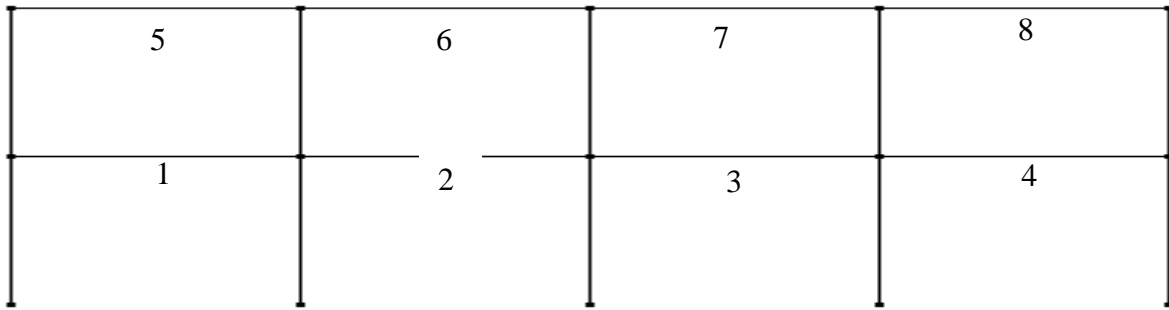
Max moments at joints:

case 3: load 1 and 2

case 4: load 3 and 4

Problem No. 5

What are the loading conditions that you should consider for the design of the frame shown below, subject to a uniform live load?



Max moments at mid-spans:

case 1: load 1, 3, 6 and 8 (will also give max moment at the left joint of span 1 and the right joint of span 8)

case 2: load 2, 4, 5 and 7 (will also give max moment at the left joint of span 5 and the right joint of span 4)

Max moments at joints:

case 3: load 1 and 2, 4, and 7 for max moment at joints between 1 and 2, and 7 and 8

case 4: load 3 and 4, 5 and 6 for max moment at joints between 3 and 4, and 5 and 6

case 5: load 2 and 3, 5 and 8 for max moment at joint between 2 and 3

case 6: load 6 and 7, 1 and 4 for max moment at joint between 6 and 7

Problem No. 6

1

Draw schematically the steel reinforcement for bending of the concrete frame shown below, subject to uniform continuous load along its beam.

