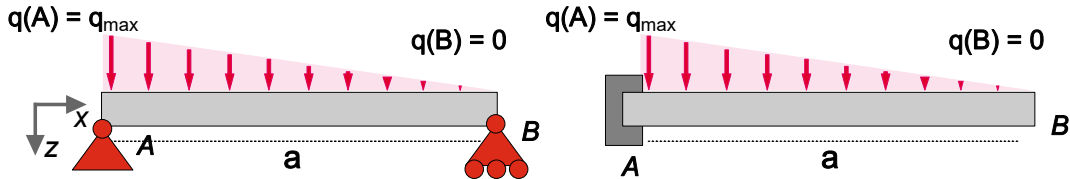


Exercise 4: Statically determinate beams

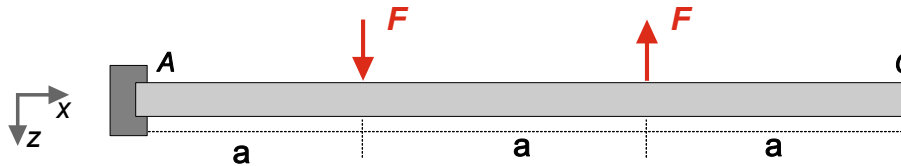
15.11.2024 - 18.11.2024

Question 1
 Beam AB is subjected to distributed load $q(x)$ that linearly varies along the beam from the maximal value of $q(A) = q_{max}$ on the left end to $q(B) = 0$ on the right. Consider two possible cases to fix the beam (left and right)

- (a) Determine internal force $Q(x)$ and internal moment $M(x)$ in the beam.
- (b) Find reaction forces and moments on the bearings.

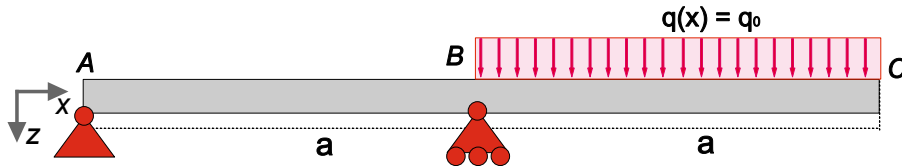


Question 2
 A beam of length $3a$ is mounted on the wall from the left. Two forces with the same magnitude but different directions are acting on the beam. Please find the internal force $Q(x)$ and moment $M(x)$. *Hint! You can use any method here*



Question 3
 The beam AC is subjected to line load at the right half. Simultaneously, exactly in the middle, this beam is supported by a roller. If you rotate this image 90 degrees counter-clockwise, you can imagine that this is a high building subjected to wind load at the top floors.

- (a) Determine internal force $Q(x)$ and internal moment $M(x)$. At which points do they reach maximum?
- (b) Find reactions (forces and moments) on bearings.



Question 4
 This is a small modification of Q3. What changes if instead of one beam supported in the middle, we consider two separate beams connected by a hinge? Note that the rightmost hinge has been "upgraded" from roller to proper hinge. Do you understand why?

- (a) Answer the same questions as in Q3
- (b) Compare your results with Q3.

