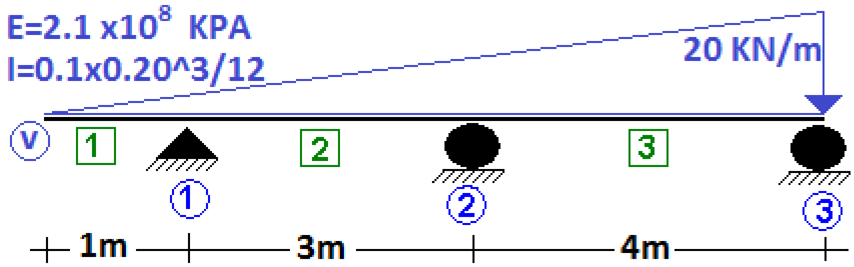
Encuentre las reacciones por el método de las Flexibilidades de la viga de la siguiente figura:

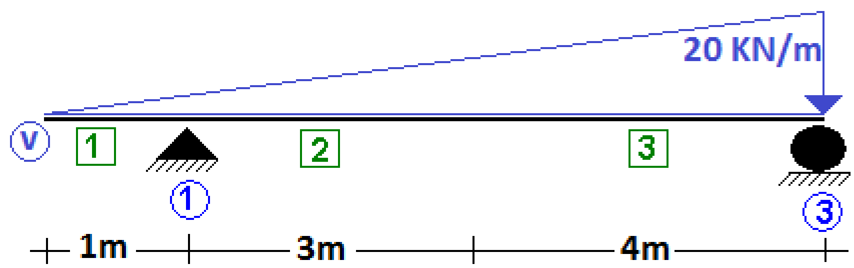


#1: [CaseMode := Sensitive, InputMode := Word]

#2: $\left[E := 2.1\cdot 10^{8},\ I := \dfrac{0.1\cdot 0.2^{3}}{12}\right]$

#3: $\left[E := 2.1\cdot 10^{8},\ I = 6.666666666\cdot 10^{-5}\right]$

Flexibilización de la estructura con reacciones y momentos flectores:



#4: [Rf1 :=, Rf3 :=]

#5: $\left[\begin{array}{c} Rf1 + Rf3 = \dfrac{20\cdot 8}{2} \\ Rf1\cdot 1 + Rf3\cdot 8 = \dfrac{20\cdot 8}{2}\cdot\dfrac{2}{3}\cdot 8 \end{array}\right]$

#6: $\left[\left[Rf1 := \dfrac{640}{21},\ Rf3 := \dfrac{1040}{21}\right]\right]$

#7: $[Rf1 = 30.47619047 \wedge Rf3 = 49.52380952]$

#8: [MF1(x) :=, MF23(x) :=, w(x) :=]

#9:

$$\left[\begin{array}{c} w(x) := \dfrac{20}{8}\cdot x \\ MF1(x) := -\dfrac{w(x)\cdot x}{2}\cdot\dfrac{1}{3}\cdot x \\ MF23(x) := -\dfrac{w(x)\cdot x}{2}\cdot\dfrac{1}{3}\cdot x + Rf1\cdot(x-1) \end{array}\right]$$

#10:

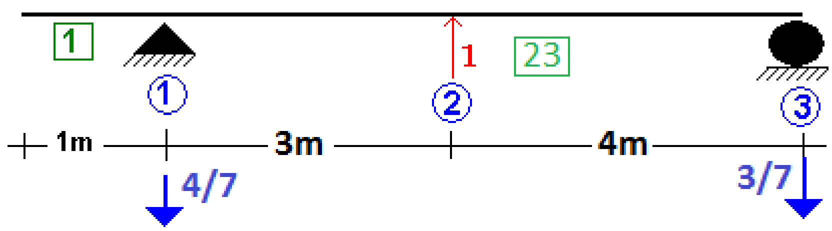
$$\left[\begin{array}{c} w(x) := \dfrac{5\cdot x}{2} \\ MF1(x) := -\dfrac{5\cdot x^3}{12} \\ MF23(x) := -\dfrac{5\cdot(7\cdot x^3 - 512\cdot x + 512)}{84} \end{array}\right]$$

#11:

$$\left[\begin{array}{c} w(x) = 2.5\cdot x \\ MF1(x) = -\ 0.4166666666\cdot x^3 \\ MF23(x) = -\ 0.05952380952\cdot(7\cdot x^3 - 512\cdot x + 512) \end{array}\right]$$

I)Deflexión de la viga flexibilizada:

Carga unitaria ficticia vertical hacia abajo en el nudo 2:



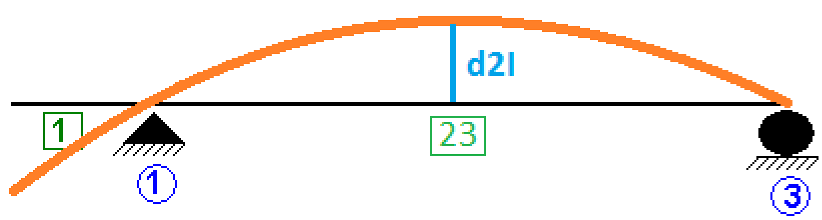
#12: [mf1(x) :=, mf2(x) :=, mf3(x) :=]

#13: $$\left[\begin{array}{c} mf1(x) := 0 \\ mf2(x) := -\frac{4}{7}\cdot(x-1) \\ mf3(x) := -\frac{4}{7}\cdot(x-1) + 1\cdot(x-4) \end{array}\right]$$

#14: $$\left[\begin{array}{c} mf1(x) := 0 \\ mf2(x) := \frac{4}{7} - \frac{4\cdot x}{7} \\ mf3(x) := \frac{3\cdot x}{7} - \frac{24}{7} \end{array}\right]$$

#15: $$\left[\begin{array}{c} mf1(x) := 0 \\ mf2(x) := 0.5714285714 - 0.5714285714\cdot x \\ mf3(x) := 0.4285714285\cdot x - 3.428571428 \end{array}\right]$$

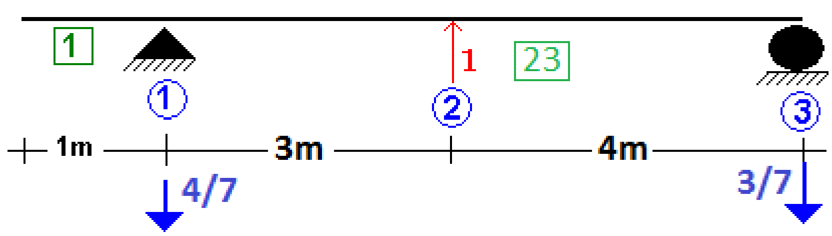
Aplicación del método de las Flexibilidades:

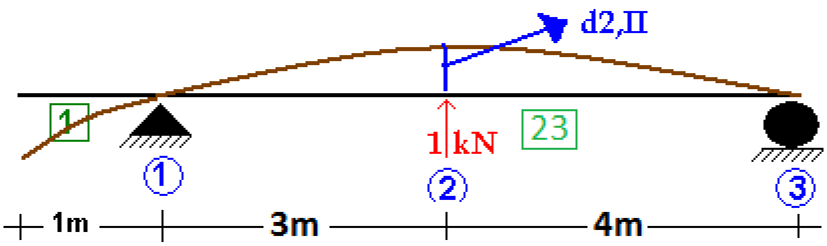


#16: $$d2I := \frac{1}{E\cdot I}\cdot\left(\int_0^1 MF1(x)\cdot mf1(x)\,dx + \int_1^4 MF23(x)\cdot mf2(x)\,dx + \int_4^8 MF23(x)\cdot mf3(x)\,dx\right)$$

#17: $$d2I := -0.02416241496$$

Carga unitaria ficticia para deflexión en el nudo 2 de la viga flexibilizada y cargada en el apoyo:





#18: $d2II := \frac{1}{E \cdot I} \cdot \left(\int_0^1 mf1(x) \cdot mf1(x)\, dx + \int_1^4 mf2(x) \cdot mf2(x)\, dx + \int_4^8 mf3(x) \cdot mf3(x)\, dx \right)$

#19: d2II := 0.0004897959183

Ecuación del método de las Flexibilidades para el apoyo 2:

#20: [R2 :=]

#21: $d2I + R2 \cdot d2II = 0$

#22: R2 := 49.3315972

Ecuaciones de la estática:

#23: [R1 :=, R3 :=]

#24: $\left[\begin{array}{c} R1 + R2 + R3 = \frac{20 \cdot 8}{2} \\ R1 \cdot 1 + R2 \cdot 4 + R3 \cdot 8 = \frac{20 \cdot 8}{2} \cdot \frac{2}{3} \cdot 8 \end{array} \right]$

#25: $[R1 = 2.286706361 \wedge R3 = 28.38169643]$