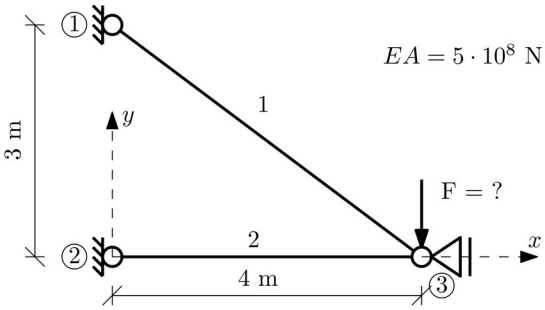
Version:	Name:	Points:				Sum:
		1	2	3	4	
A						

Task 1: Determine the magnitude of the force F if the vertical displacement of node No. 3 is equal 0.01m.

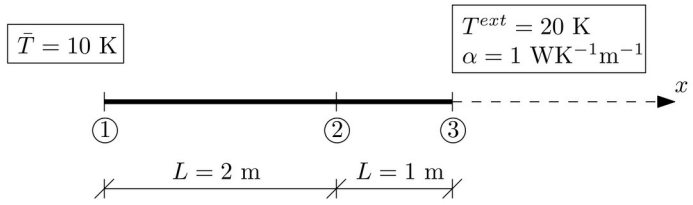


$$\mathbf{K}^{ge} = \frac{E^e A^e}{L^e} \begin{bmatrix} c^2 & cs & -c^2 & -cs \\ cs & s^2 & -cs & -s^2 \\ -c^2 & -cs & c^2 & cs \\ -cs & -s^2 & cs & s^2 \end{bmatrix}$$

$c = \cos(\phi^e),\ s = \sin(\phi^e)$

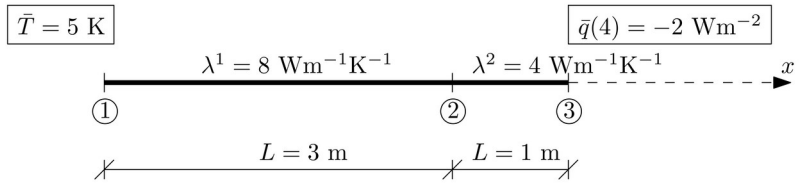
$$F = -3.6 \cdot 10^5 \text{ N}$$

Task 2: Determine the temperature at node No. 2. Consider the value of heat conductivity 8 $Wm^{-1}K^{-1}$.



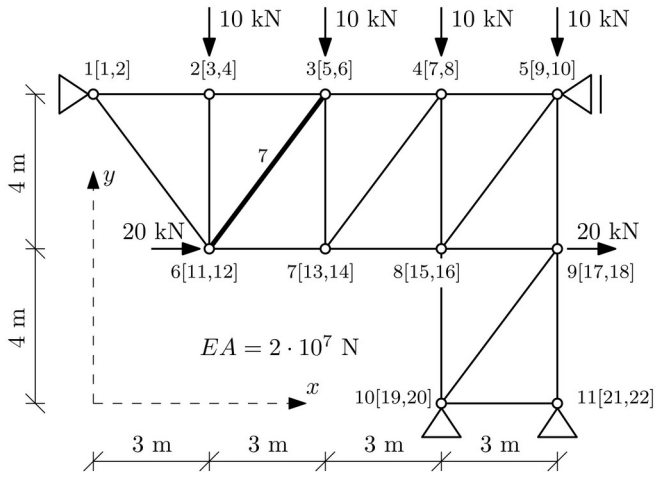
$$T_2 = 11.818 \text{ K}$$

Task 3: Determine the right-hand side vector for all degrees of freedom.
The problem is discretized by two elements with linear approximation functions.



$$f = \begin{Bmatrix} 0 \\ 0 \\ 2 \end{Bmatrix}$$

Task 4: Determine the axial force in bar No. 7.



Vector of nodal displacements: [m]

1: {0.0000e+00, 0.0000e+00}
2: {6.9697e-04, -7.1498e-03}
3: {1.3939e-03, -7.4388e-03}
4: {7.8661e-04, -5.1346e-03}
5: {0.0000e+00, -2.3943e-03}
6: {4.3803e-03, -5.1498e-03}
7: {5.1139e-03, -7.7575e-03}
8: {6.0268e-03, -3.4533e-03}
9: {7.9364e-03, -2.1664e-03}
10: {0.0000e+00, 0.0000e+00}
11: {0.0000e+00, 0.0000e+00}

$$s_7 = -1.449 \cdot 10^4 \text{ N}$$

Many thanks to Edita Dvořáková and Bořek Patzák for creating this test.