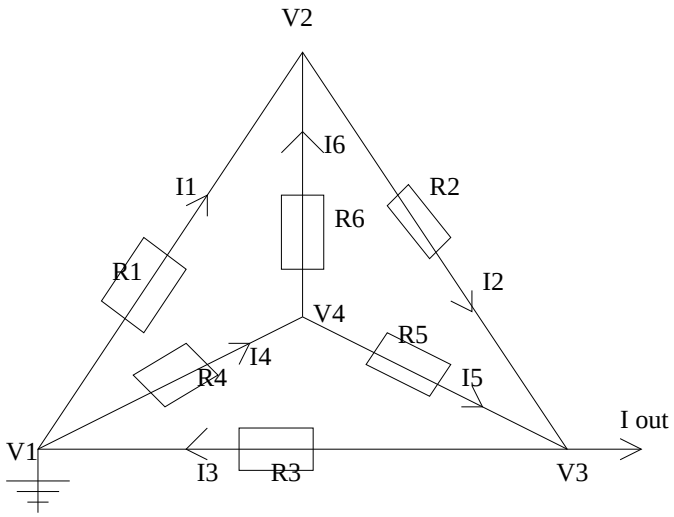
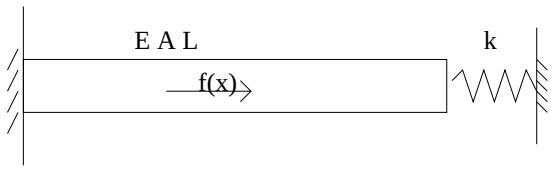
Exercise 2

Problem 1
Consider following network



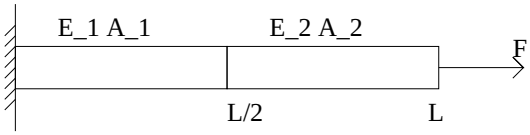
Write down in matrix form the voltage drops as a function of voltages, the currents as a function of voltage drops, and the conservation of currents. Lastly write down system of equations from which the voltages can be determined.

Problem 2 **(home exercise)**
You can choose your this weeks home exercise. Do this one or the MATLAB problem proposed in last weeks exercise paper.
Consider the following rod



where $f(x)$ is a distributed load and k is the spring constant. Write down the energy expression (M), principle of virtual work (V), and boundary value problem (D) for this problem.

Problem 3
Consider the following rod



built of two different materials having different cross sections. As in previous problem, write down the three formulations (M), (V), and (D).

Problem 4
Consider the following rod

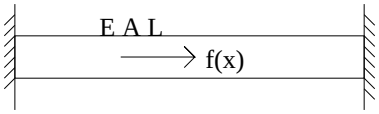


Figure out and/or prove that the solution is given by

$$u(x) = \int_0^L K(x,y) f(y)\, dy,$$

where $K(x,y)$ has been obtained in last weeks problem 2.

Alternate home exercise
Make your own MATLAB program by which simple strusses can be analyzed. Make experiments on systems with and without unique solutions. In the latter case, check the nullspaces of the equilibrium equation and the force compatibility conditions. Compute and print the eigenmodes of some simple structures.