NONLINEAR ANALYSIS OF A SHALLOW TRUSS IN PYTHON

First we do our import statements

```
from numpy import sqrt
from scipy.optimize import newton, minimize
import matplotlib.pyplot as plt
```

The following set of parameters constitute a well-behaving problem:

```
# Units are understood in [kN] and [m]
b = 10.  # half of the total width of the structure in [m]
h = 0.5  # initial height of the structure in [m]
EA = 5000.  # <Young's modulus> * <Cross sectional area> in [kN/m2]
k = 1.0  # spring stiffness [kN/m]
F = 1.5  # applied load in [kN]
```

EQUILIBRIUM APPROACH

We use the equilibrium equations to create two residual functions, one for force-controlled and another for displacement-controlled calculations.