Example 2.2.8

The I-section cantilever beam shown in Figure 1a is 1 m long and subjected to two orthogonal loads, resulting in a downward vertical force of 3 kN (generating a negative moment about axis *z*) and a horizontal force of 1 kN (generating a negative moment about axis *y*) at the tip as shown. The cross-section is doubly-symmetric with the dimensions shown in Figure 1b. The beam is made of steel with $E = 200$ GPa. Assuming linear behaviour throughout, calculate the axial stresses at the four points *a*, *b*, *c* and *d* at the built-in end of the beam, as shown in Figure 1c.

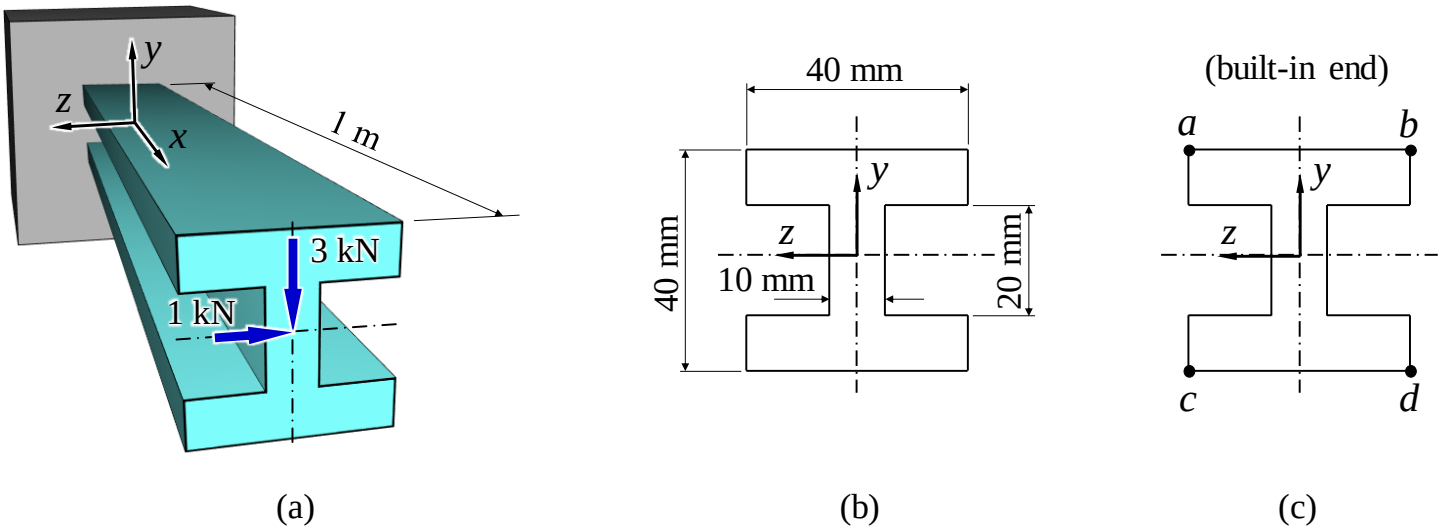

Figure 1: An I-section beam subjected to two orthogonal transverse loads.