Homework assignment 2

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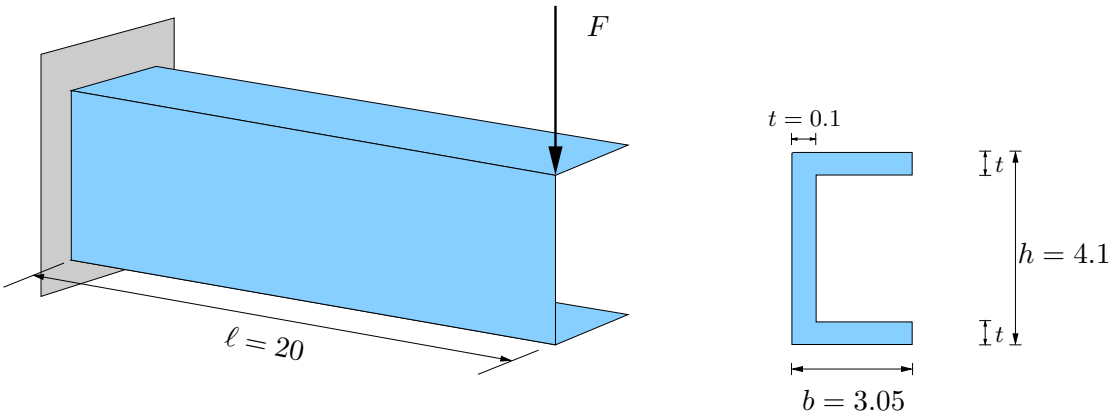
1 Excercise

Deloppgave 1.1
The figure below show a cantilever with a U cross section.



Find the

- centroid, the second moments of inertia, the principal axes, and
- the shear center.
- Remove one of the flanges and recompute the principal axes.

Deloppgave 1.2
Compute the end displacement of the cantilever

- analytically using classical beam theory,
- numerically using `BEAM44` in `ANSYS`. Use `SECDATA` to define the cross section. Check using `ESHAPE, 1` that the model and cross section are correct. (`BEAM188` show better results in the post processor.)

The the maximum axial stress, σ_{xx}. Is shear important?

Deloppgave 1.3
Model the beam using shell elements, `SHELL63`, in `ANSYS`. Find

- the end displacement (a quantity that can be compared to the beam), and
- the maximal axial stress, σ_{xx}.

Compare to the beam results.

Deloppgave 1.4
Is the *Naviers hypotesis*, i.e. plane cross sections remains plane, satisfied?

2 Solution

A ANSYS input file

```
%
```