AE4520: Advanced Structural Analysis
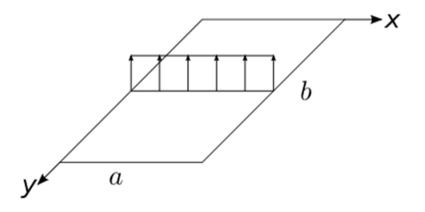
Food for thought (plates)

Mostafa Abdalla

TU Delft

Delft
University of
Technology

Problem 1: Plate Bending

- A simply supported rectangular plate is loaded by a lateral load distribution of net resultant P.
- The plate has a length a in x direction and b in y direction.
- The plate thickness is t and the plate is made of an isotropic material of Young's modulus E and Poisson's ratio ν.

- Plot the centre deflection of the plate as a function of the ratio a/b
- *Normalise the centre displacement by Pb^3/Et^3a*

Problem 2: Plate Buckling

- For a simply supported rectangular plate of aspect ratio 2, plot the buckling interaction curve under biaxial compressive loads N_x and N_y

- [Hint: Find the line(s) in $N_x - N_y$ plane for which the plate is in critical state]