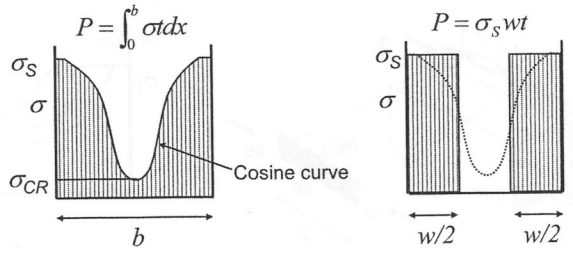


Exercise 3.15

3.16 Effective width

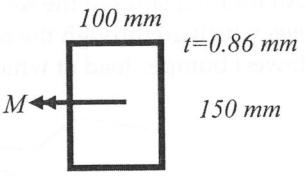
Using hand calculations determine the following:

a) At what bending moment, M_{CR}, will the top cap just buckle?

b) What is the effective width of the top cap when σ_S=1.1 σ_{CR}, 1.5 σ_{CR}, *and* 2.0 σ_{CR}?

c) What is the effective moment of inertia *Ixx* when σ_S=2.0 σ_{CR}?

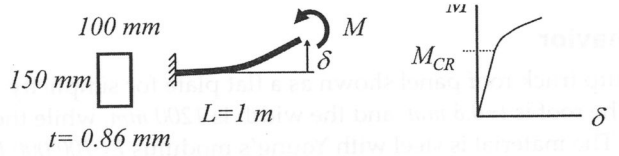
d) What is the applied moment when the maximum stress in the top cap is σ_S= 2.0 σ_{CR}?



Exercise 3.16

3.17 Effective properties after buckling

Determine the bending moment vs. tip deflection for the beam shown. The result should look similar to the graph shown. Consider only plate buckling behavior of the upper cap of the section. Plot the range $0 < M < 5\ M_{CR}$.



Exercise 3.17

3.18 Between-weld flange buckling

Spot-weld spacing, *p*, affects the stress at which flange buckling occurs. The flange design stress is the lower of yield or buckling. For a mild steel flange of thickness, *t*, and height *17 mm*, plot the flange design stress vs. weld pitch, *p*, for the range *24 mm<p<75 mm*, with separate curves for *t=0.5 mm, t=1 mm, and t=1.5 mm.*