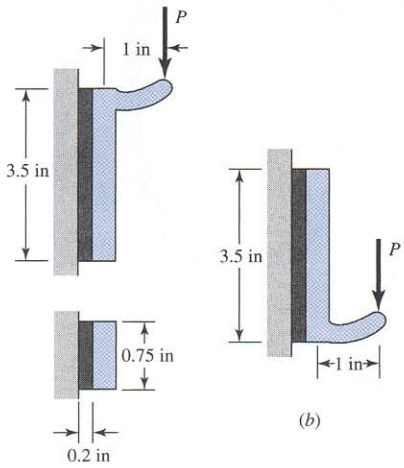
Problem 9–28



and it follows that

$$K = \frac{P\omega}{4b\tanh(\omega l/2)}\frac{2bl}{P} = \frac{\omega l/2}{\tanh(\omega l/2)} = \frac{\omega l}{2}\frac{\exp(\omega l/2)+\exp(-\omega l/2)}{\exp(\omega l/2)-\exp(-\omega l/2)}$$

9–30 Program the shear-lag solution for the shear-stress state into your computer using Eq. (9–12). Determine the maximum shear stress for each of the following scenarios:

Part	E_a, psi	t_o, in	t_i, in	E_o, psi	E_i, psi	h, in
a	$0.2(10^6)$	0.125	0.250	$30(10^6)$	$30(10^6)$	0.005
b	$0.2(10^6)$	0.125	0.250	$30(10^6)$	$30(10^6)$	0.015
c	$0.2(10^6)$	0.125	0.125	$30(10^6)$	$30(10^6)$	0.005
d	$0.2(10^6)$	0.125	0.250	$30(10^6)$	$10(10^6)$	0.005

Provide plots of the actual stress distributions predicted by this analysis. You may omit thermal stresses from the calculations, assuming that the service temperature is similar to the stress-free temperature. If the allowable shear stress is 800 psi and the load to be carried is 300 lbf, estimate the respective factors of safety for each geometry. Let $l = 1.25$ in and $b = 1$ in.