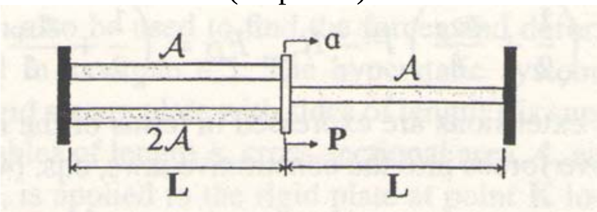
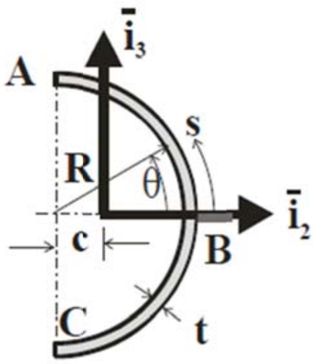
2012년도 2학기 항공기 구조역학 중간고사

1. Three axial loaded bars, each of length L and all constructed from a material of elasticity modulus E, are arranged as shown in figure. Two bars are connected in parallel and one of these has a cross-sectional area that is twice that of the other. A third bar is connected in series at the common point. An axial load, P, is applied at the junction of the three bars. Using the displacement method, determine
   (1) The displacement, d, of the connecting point between the three bars (10 points)
   (2) The forces in each of the three bars (10 points)



2. Figure depicts the thin-walled, semi-circular open cross-section of a beam. The wall thickness is t, and the material Young's and shearing moduli are E and G, respectively. Find the location of the shear center of the section. (It is more convenient to work with the angle θ as a variable describing the geometry of the section: $s = R\theta, ds = Rd\theta$.)
   (30 points)



3. The thin-walled, rectangular beam section shown in figure is subjected to a horizontal shear force, V_2. The thickness of the right vertical web is $5t$, whereas that of the remaining walls is t.
   (1) Determine the centroidal bending stiffnesses of the section. (20 points)
   (2) Find the shear flow distribution in the section. (20 points)
   (3) Verify that all joint and edge equilibrium conditions. (10 points)