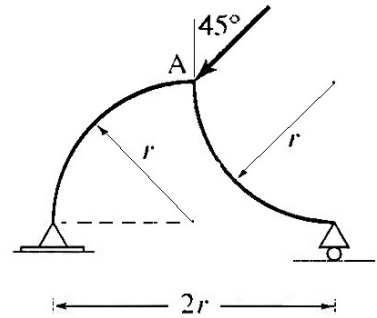
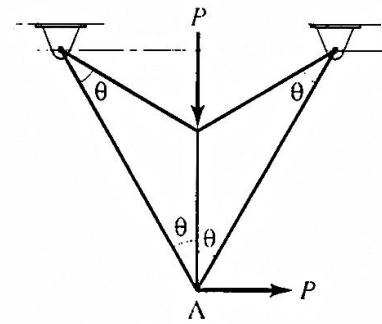


HW Set 4, Theory of Elasticity

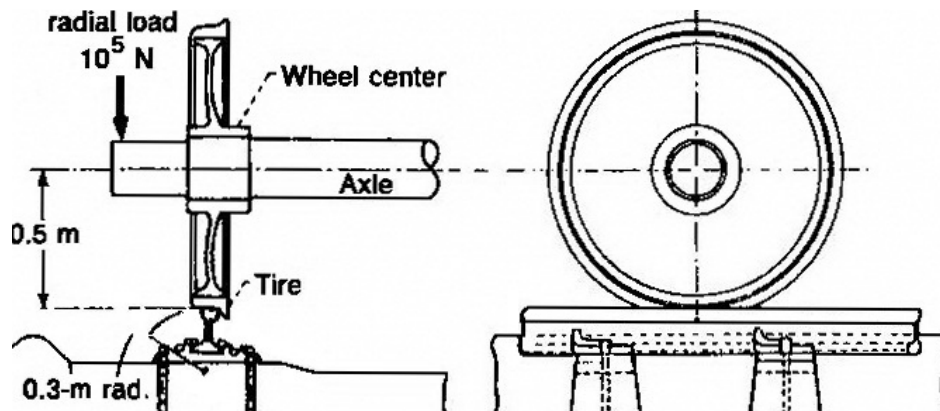
- Using Castigliano's theorem, determine the horizontal and vertical deflections at point A of the below sketch. Assume that E and I are constant.



- For the structure shown in below, find the force in each member and determine the deflection of point A. Assume that E and A (cross section area) are constant.



- The figure in below shows the contact between a locomotive wheel and the rail. The Applied load on each wheel is 100 kN. Both wheel and rail are made of harden steel and the radii of wheel and the rail crown are 0.5 m and 0.3 m respectively. Determine the maximum contact stress, the maximum elastic deformation and the contact dimensions.



4. The steel bar shown in below has length of l and thickness of $2h$ and is bounded between two rigid walls and is subjected to 50°C temperature increase. Determine the stress and strain field induced due to the temperature rise.



5. Cam and follower shown in the picture delivers 5560 N load at average velocity of 0.3 m/s . Both of them are made of stainless steel and have a thickness of 20 mm . What are the maximum contact stress and the largest deformation in this contact? Dimensions of the picture are in mm.

