FIGURE P6-30

Problems 6-83 to 6-86 An oil field pump - dimensions in inches

6-83　Find all instant centers of the linkage in Figure P6-30 in the position shown.

6-84　Find the angular velocities of links 3 and 4 and the linear velocities of points A, B and P_1 in the *XY* coordinate system for the linkage in Figure P6-30 in the position shown. Assume that $\theta_2 = 45°$ in the *XY*-coordinate system and $\omega_2 = 10$ rad/sec. The coordinates of the point P_1 on link 4 are (114.68, 33.19) with respect to the *xy* coordinate system.

　　a.　Using a graphical method.
　　b.　Using the method of instant centers.
　†c.　Using an analytical method.

†6-85　Using the data from Problem 6-83, write a computer program or use an equation solver such as *Mathcad, Matlab,* or *TKSolver* to calculate and plot magnitude and direction of the absolute velocity of point P_1 in Figure P6-30 as a function of θ_2.

† These problems are suited to solution using *Mathcad, Matlab,* or *TKSolver* equation solver programs. In most cases, your solution can be checked with program FOURBAR.