Palestine Technical University- Kadoorie (PTUK)

Mechanical Engineering Department

12210244: Dynamics

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This is an explanation of the Dynamics course

offered at Palestine Technical University - Kadoorie

Prepared by:

Dr. Hammam Daraghma

Textbook:

Engineering Mechanics: Dynamics, 7th Edition

Author:

J.L. Meriam and L.G. Kraige, 2013

Chapter Five: Plane Kinematics of Rigid Bodies

Section Five: Instantaneous Center of Zero Velocity

5 Chapter Five: Plane Kinematics of Rigid Bodies

5.5 Instantaneous Center of Zero Velocity

$$\omega = \frac{v_A}{r_A}$$

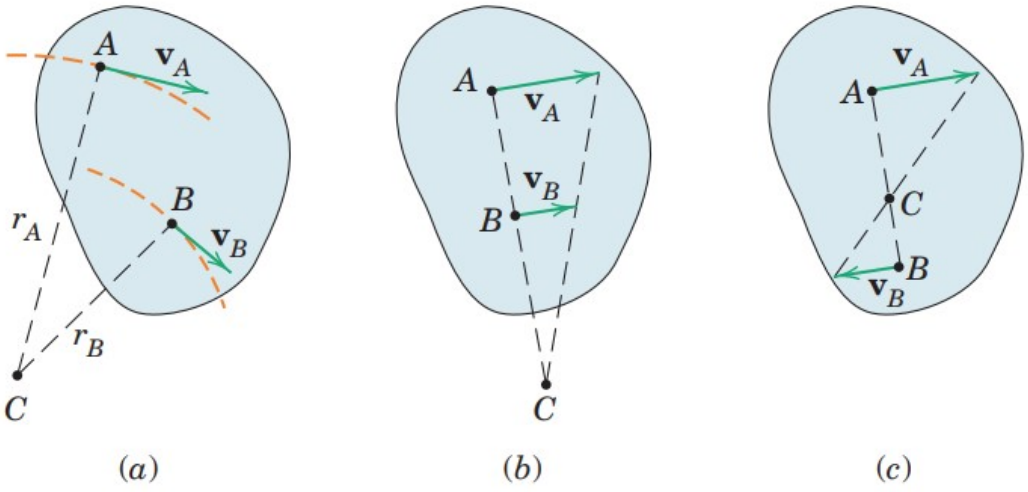


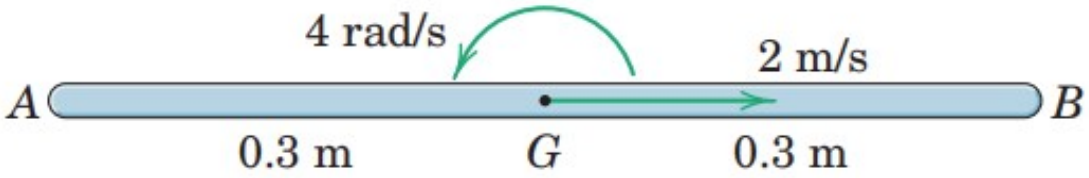
Figure 5/7

End of Section 5.5

Example 1:

The slender bar is moving in general plane motion with the indicated linear and angular properties. Locate the instantaneous center of zero velocity and determine the velocities of points A and B.

ans. IC is above point G 0.5 m$v_A = v_B = 2.33\ m/sec$

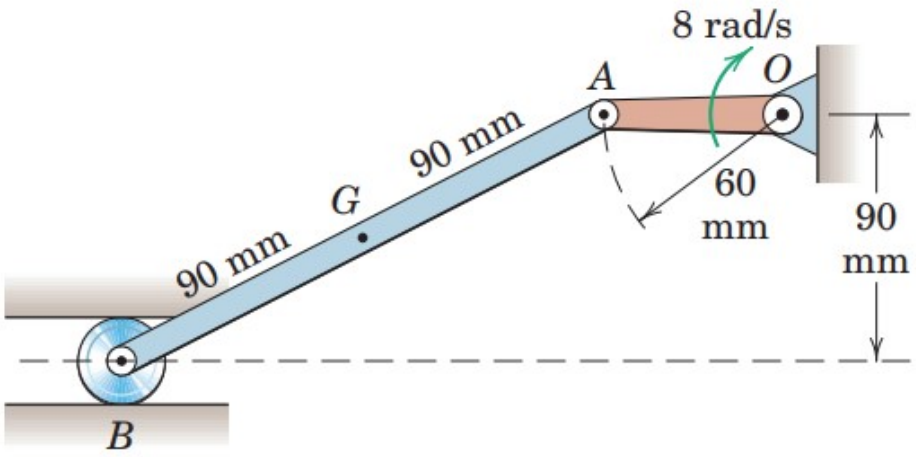


Ans.

Example 2:

For the instant represented, when crank OA passes the horizontal position, determine the velocity of the center G of link AB.

ans. $v = 277\ mm/sec$

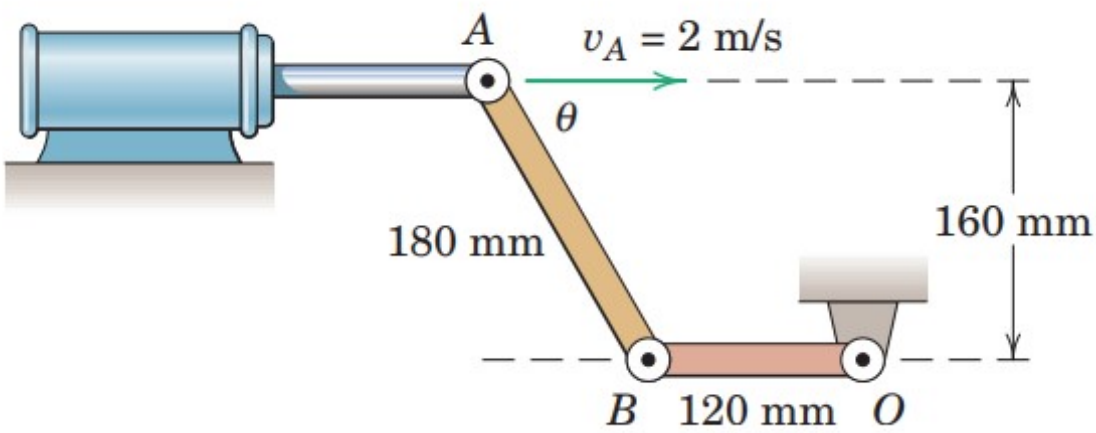


Ans.

Example 3:

Solve for the angular velocity of OB

$\omega_{OB} = 8.59\ rad/sec$

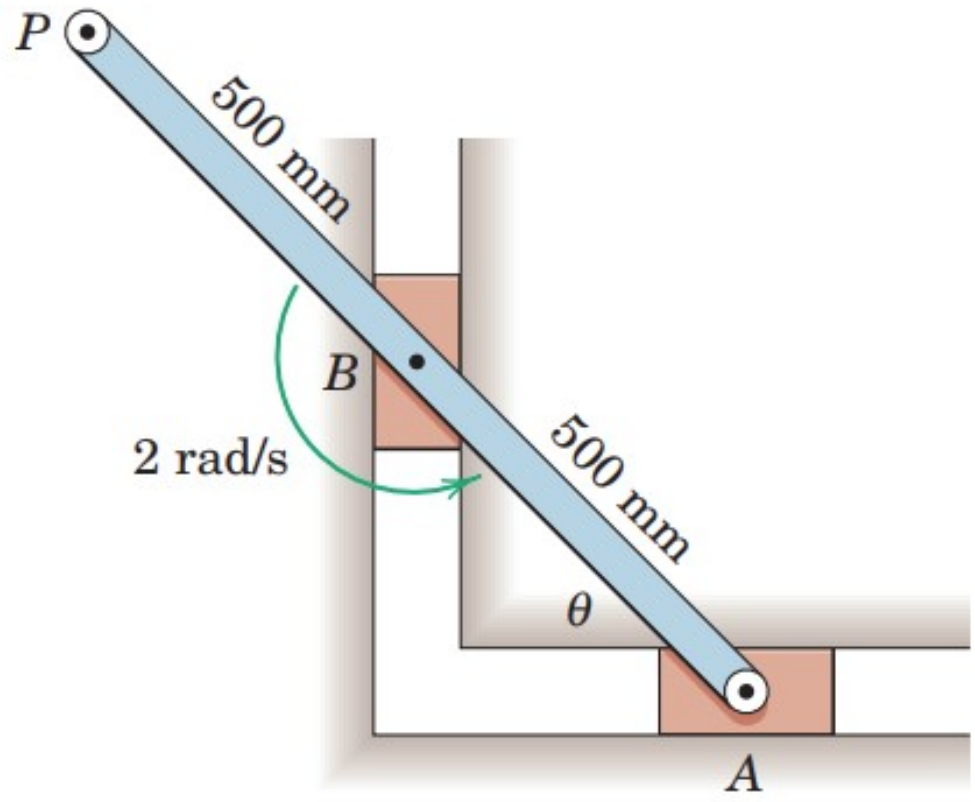


Ans.

Example 4:

Motion of the bar is controlled by the constrained paths of A and B. If the angular velocity of the bar is 2 rad/sec counterclockwise as the position $\theta = 45°$ is passed, determine the speeds of points A and P.

ans. $v_A = v_B = 0.707\ m/sec$ $v_P = 1.581\ m/sec$



Ans.