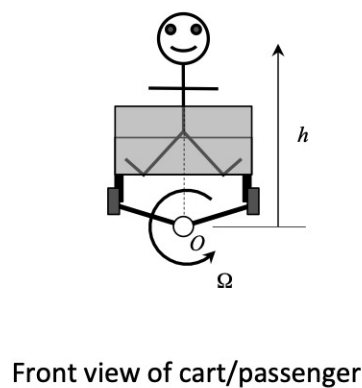
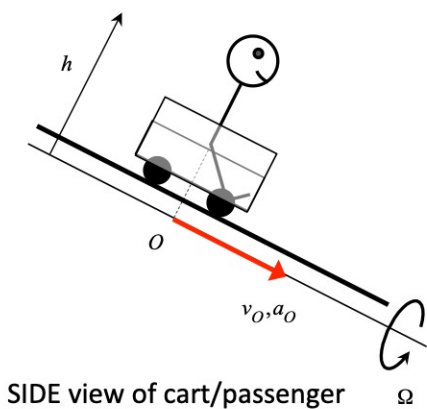


Homework H.2.I

Given: A passenger rides in a cart on a roller coaster track where point O directly under the cart on the track moves with a speed of v_O and a_O . At the time time, the cart is executing a “barrel roll” with the cart rotating about point O on the track with a constant rotation rate Ω .

Find: For this problem:

- (a) Determine the velocity and acceleration of the passenger’s head, where the head is located at a distance h above point O on the track. Write your answer as a vector.
- (b) What is the magnitude of acceleration and the rate of change of speed of the passenger’s head?



Use the following parameters in your analysis: $v_O = 30$ ft/s, $a_O = 15$ ft/s², $h = 4$ ft and $\Omega = 2$ rad/s.

Homework H.2.J

Given: A mechanism is made up of links AB, BD and DE joined together with pins, as shown in the figures. Link AB is known to be rotating in a counter-clockwise sense with a constant angular speed of ω_{AB} . At the instant shown, links AB and DE are horizontal, and pin D is directly below pin A.

Find: For the position shown:

- Determine the angular velocities of links BD and DE. Write your answers as vectors.
- Determine the angular accelerations of links BD and DE. Write your answers as vectors.

