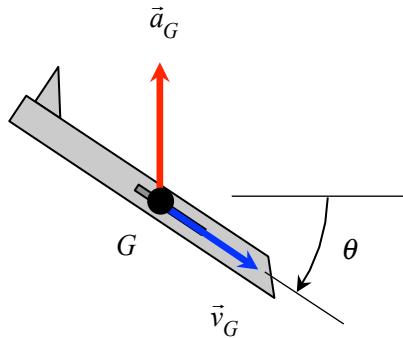


**Homework H1.C**

**Given:** At one instant in time, an aircraft is traveling along a path in a direction defined by  $\theta$  below the horizontal with the center of mass G of the aircraft having a speed of  $|\vec{v}_G|$ . G is also known to have an acceleration that is pointing vertically upward with a magnitude of  $|\vec{a}_G|$ .

**Find:** For this given instant in time:

- (a) show the path unit vectors  $\hat{e}_t$  and  $\hat{e}_n$ , along with  $\vec{v}_G$  and  $\vec{a}_G$ , in a sketch.
- (b) determine the rate of change of speed of G and the radius of curvature of G.



Use the following parameters in your work:  $\theta = 36.87^\circ$ ,  $|\vec{v}_G| = 900$  km/hr and  $|\vec{a}_G| = 30$  m/s<sup>2</sup>.