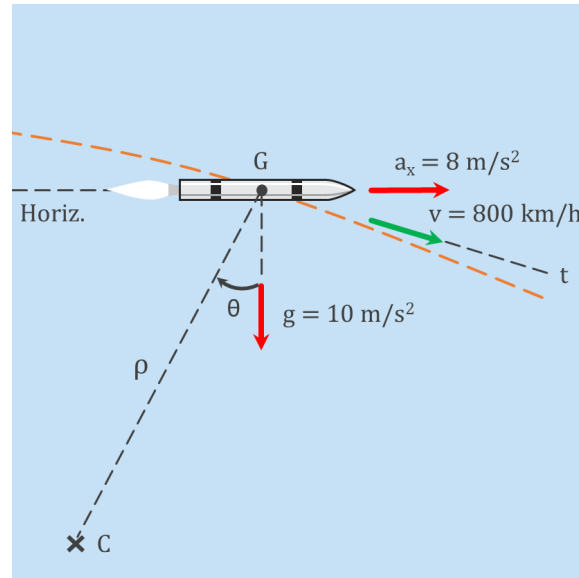# Rocket Accelerates

A rocket maintains at horizontal attitude of its axis during the powered phase of its flight (see the Figure). The acceleration due to horizontal thrust is 8 m/s², and the downward acceleration due to gravity is $g = 10$ m/s². At the instant represented, the velocity of the centre of mass G of the rocket along the $\theta = 15°$ direction of its trajectory is 800 km/h. Determine an expression for the angular rate $\dot{\beta}$ of the radial line from G to the centre of curvature C.

Using known expressions:

$$v = \rho\dot{\beta} \tag{1}$$

Solution:

$$v = \rho\dot{\beta} \quad \Rightarrow \quad \dot{\beta} = \frac{v}{\rho} \tag{2}$$