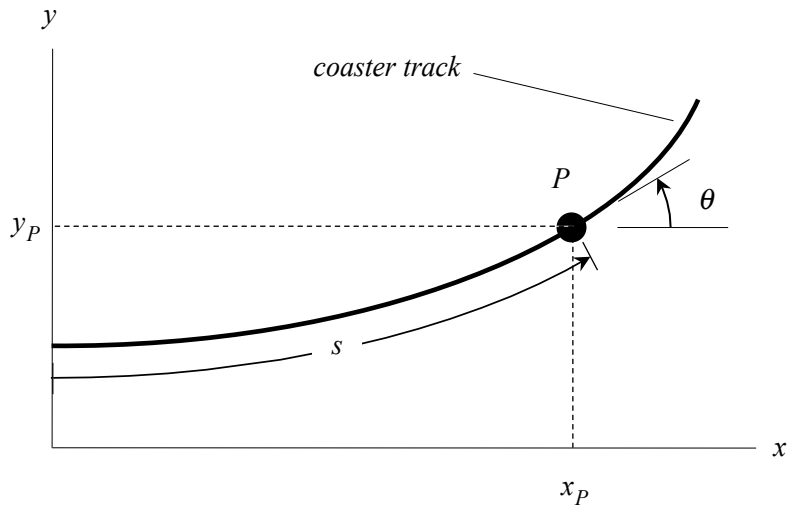
Homework H.1.C

Given: Cart P travels on a rollercoaster track. Let s represent the distance traveled by P on this track, where s has units of feet. In terms of the distance s, the radius of curvature of the track, the angle of the tangent to the track and the speed of P are known to be $\rho = 1/bs$, $\theta = bs^2/2$ and $v(s) = d - cs^2$, respectively.

Find: For this problem:

(a) Determine the path variable components of velocity and acceleration of P as a function of s.

(b) Evaluate your results in (a) above for $s = 100$ ft. Make a sketch of the velocity and acceleration vectors at this position.



Use the following parameters in your analysis: $b = 1\times10^{-4}/ft^2$, $d = 150$ ft/s and $c = 1\times10^{-2}/ft\cdot s$.