# Quiz 01

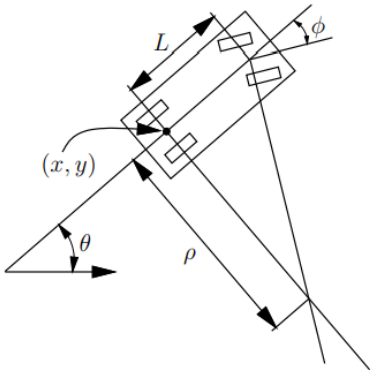


Figure 1: Simple car model

1. If the speed $v$ and steering angle $\phi$ are directly specified by the control inputs $u_s$ and $u_\phi$, respectively, define the transition equation for simple car? Make necessary assumptions
2. What steering angles are possible? Define the possible angle range and give explanation for the range you specified?
3. What is the minimum value $\rho_{min}$ that $\rho$ can obtaine and why?
4. Consider the following case: the speed of the car is restricted only for three discrete values, i.e., $u_s = \{-1, 0, 1\}$ or a car with three gears: reverse, park, and forward.
5. Can you make an educated guess about how to find the optimal path that car has to travel from s to e? Assume that $u_s = \{-1, 0, 1\}$ and always $\rho = \rho_{min}$