# Cart-pole Scenario Set-up (Advance Hands-on Proj.)

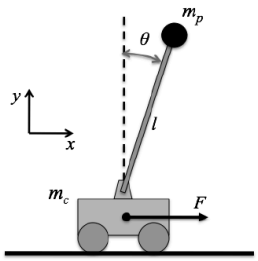
Use equations and model parameters from Deisenroth, M. P. (2010), Appendix C.2.

$$s = \{x, \dot{x}, \theta, \dot{\theta}\}$$

Deisenroth, M. P. (2010). Efficient reinforcement learning using Gaussian processes. KIT Scientific Publishing.

Ranges of variation:

$$x = [-6, 6]$$
$$\dot{x} = [-10, 10]$$
$$\theta = [-\pi, \pi]$$
$$\dot{\theta} = [-10, 10]$$
$$F = [-10, 10]$$




Simulation interval 0.01 seconds.
Action interval of 0.1 seconds.

Reward function:

$$r(s,a) = -(1 - exp(-0.5\,(j - j_{target})\,T^{-1}\,(j - j_{target})'));$$

$$T^{-1} := A^2 \begin{bmatrix} 1 & l & 0 \\ l & l^2 & 0 \\ 0 & 0 & l^2 \end{bmatrix}$$

$l$ = length of pendulum

$$A = 1$$

$$j = \left(x, \sin(\theta), \cos(\theta)\right)$$

$$j_{\text{target}} = (0, 0, 1)$$