Drones and Autonomous Systems Lab (DASL@UNLV)

DARwIn-OP Introduction [DASL-104]
Summer/2017

Homework #1

Questions:

1 – Read the following ROBOTIS's web-pages "Getting DARWIN-OP Ready and Powering On"; ""Turning DARWIN-OP Off". (http://support.robotis.com/en/product/darwin-op/operating.htm); (http://support.robotis.com/en/product/darwin-op/operating/turning_darwin-op_off.htm). Then draw some schematics(diagrams) on how to safely turn on and off.

2 – Read the following paper "Development of Open Humanoid Platform DARwIn-OP"(http://ieeexplore.ieee.org/document/6060333/#full-text-section). Fill the blanks bellow:

a) The MX-28(Dynamixel) supports _____ controller for position and speed control.

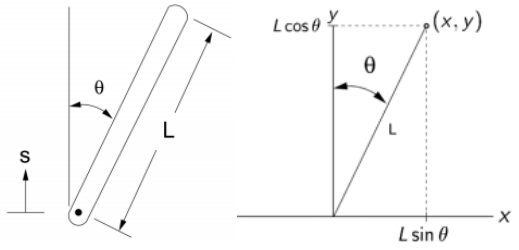
b) DARwIn-OP has two basic sensors. They are 3-axis _____ and a 3-axis _____ for posture estimation and balancing are mounted in the upper body

c) DARwin-OP's framework has been developed with ___ programming language where the code is operating system-independent.

d) DARwin-OP's O/S (operational system) is _____.

3 – Based on the picture and equation bellow, why is Euler-Lagrange equation important to derivate the inverted pendulum equations of motion.

$$x = L\sin\theta \qquad \dot{x} = L\cos(\theta)\dot{\theta}$$
$$y = L\cos\theta \qquad \dot{y} = -L\sin(\theta)\dot{\theta}$$



Lagrangian definition

$$\mathcal{L} = E_k - E_p$$
$$\mathcal{L} = \frac{1}{2}mv^2 - mgy$$