University of California Santa Cruz
Electrical and Computer Engineering

Bioinspire Locomotion – ECE 216

Homowork 1 – Deadline Friday Week 10 11:59PM

Please read the papers included in the "Homework 1" folder as well as Chapter 3 in the "Bioinspired Legged Locomotion" book (the book is free through the UCSC library system. Please see the Introductory lecture for the full reference).

Question 1

Derive a SLIP-based locomotion model either for yourself or for one of your friends/colleagues.

1. State your simplifying assumptions
2. Explain how you derived the model and how/why it's gait is equivalent with the one of the person you chose to model.
3. Derive the equations of motion
4. Plot the changes of at least 1 parameter over the span of one step to demonstrate your model is working. Examples of possible graphs:
   (a) Leg angle vs. time
   (b) x vs. time (where x is the direction of travel)
   (c) y vs. time (where y is the vertical direction)
   (d) x vs. y
   (e) your parameter of choice

Question 2

Choose a quadruped (e.g., your favorite pat) and derive a SLIP-based locomotion model.

1. State your simplifying assumptions
2. Explain how you derived the model and how/why it's gait is equivalent with the one of the person you chose to model.
3. Derive the equations of motion
4. Optional question: Plot the changes of at least 1 parameter over the span of one step to demonstrate your model is working. Examples of possible graphs:
   (a) Leg angle vs. time
   (b) x vs. time (where x is the direction of travel)
   (c) y vs. time (where y is the vertical direction)
   (d) x vs. y
   (e) your parameter of choice