Dec 02

**PD control script to control arm swing angular velocity – ramp for position matching step input for angular vel.**

**Take away: there also looks like there is an optimal angular velocity and timing for a given ankle stiffness.**

Sweep1 – 4\*70k stiffness, PD params 2 and 0.05 (from experiment), real leg dimensions.

**For most if not all of the sims on Nov29-Dec2, I used a lighter arm end mass (25g)**

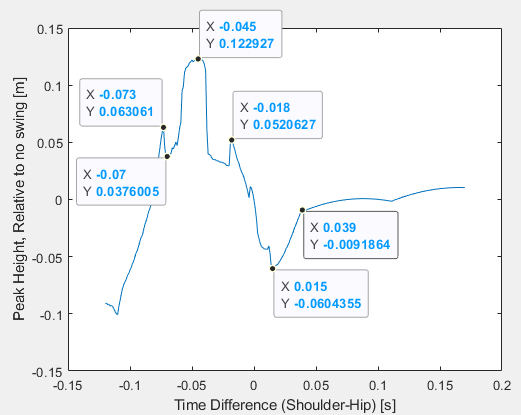
**Overall there are a lot of small factors that are affecting this system, namely ankle stiffness, leg dimension, PD parameters for arm swing, pretty precise arm timing, arm end mass (haven’t sweeped yet how much that affects it)**

Dec 01

**Can we slow everything down to make it more visible?**

Ran simulation sweep with varying spring stiffnesses – take away – **there is a middle stiffness that gives peak jump, and peak jump area tends to look like the “bump” like we see below.**

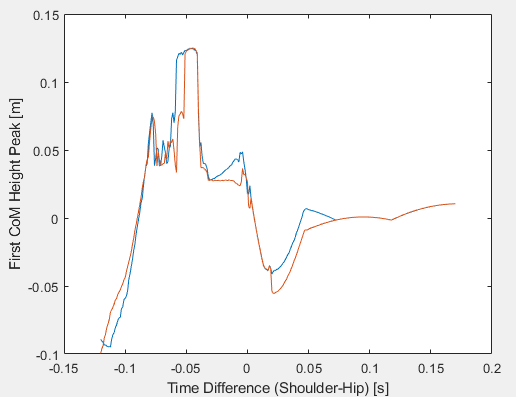
Ran simulations again with leg lengths matching Brandon’s CAD measurements (longer lower leg). Recorded videos at a couple of points.



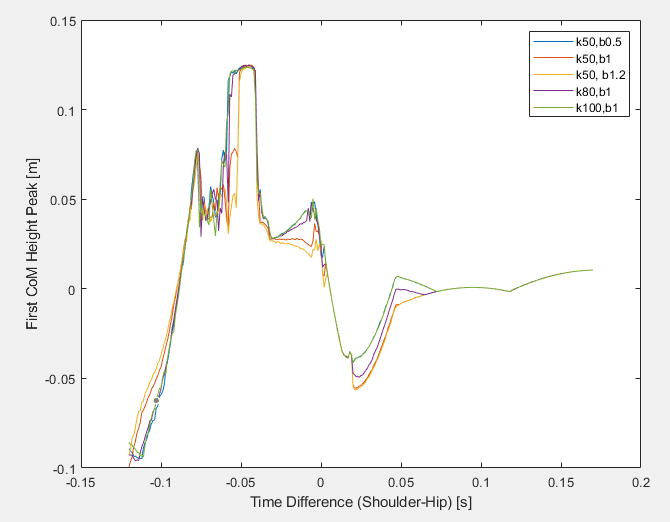
Varying arm swing control parameters

Original params (used in Nov29) were k=50 and b =0.5.

If raise b to 1 (“Armk50b1”), then the excessive swinging seen in the post-jump swings (tis > 0) decreases, the overall curve also changes for the parameter sweep. See compared nov29 (damp 0.5, blue) to Dec1,k50b1 (orange)



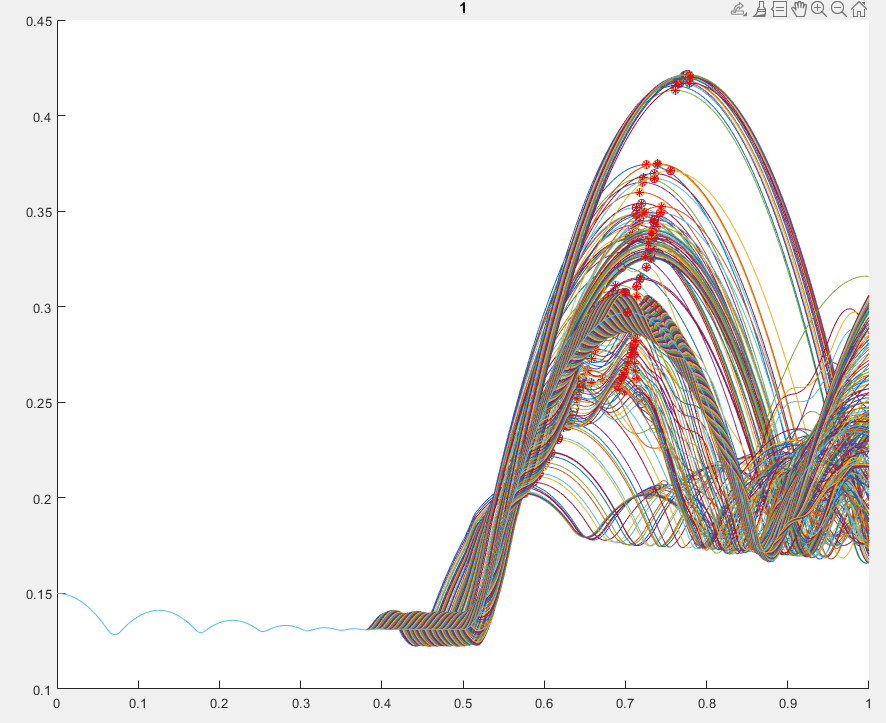
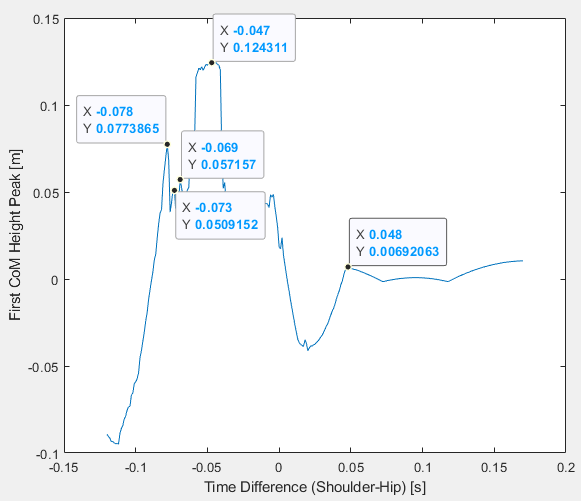
Big comparison one with ankle at 4k



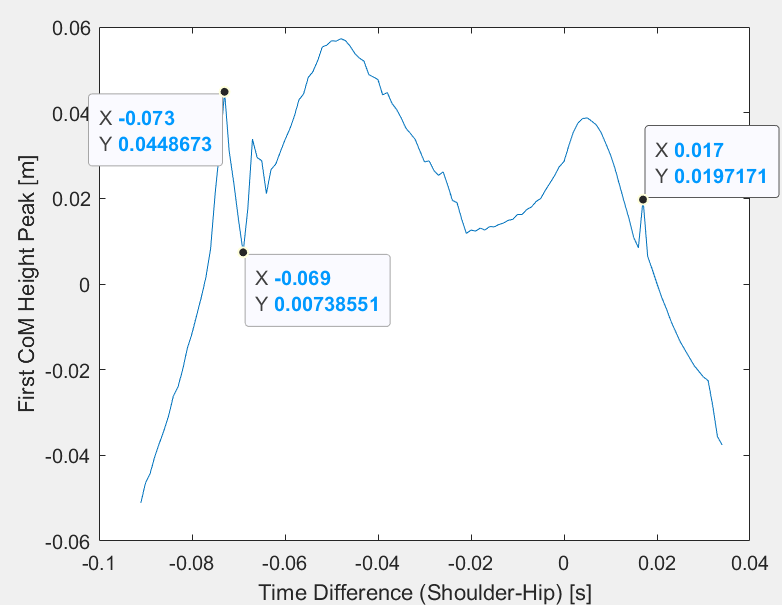
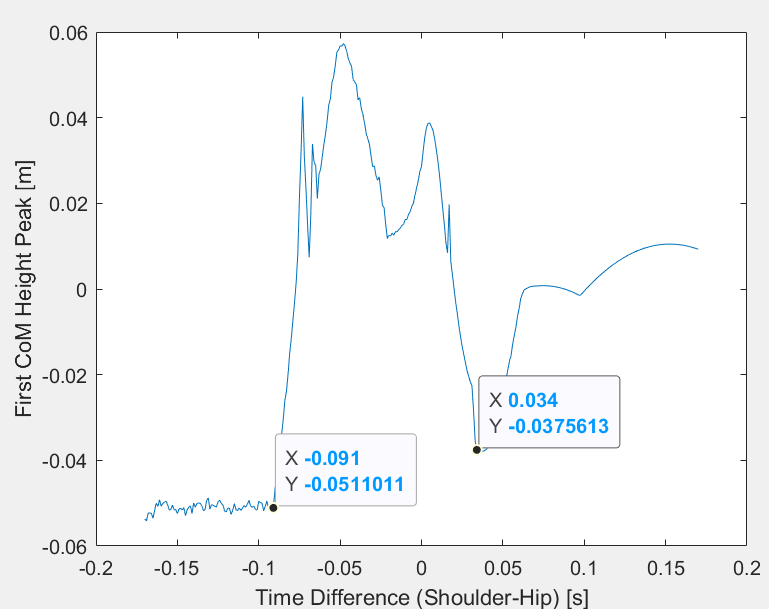
Nov 29

Updated potential energy term in derive\_everyting, behavior much better.

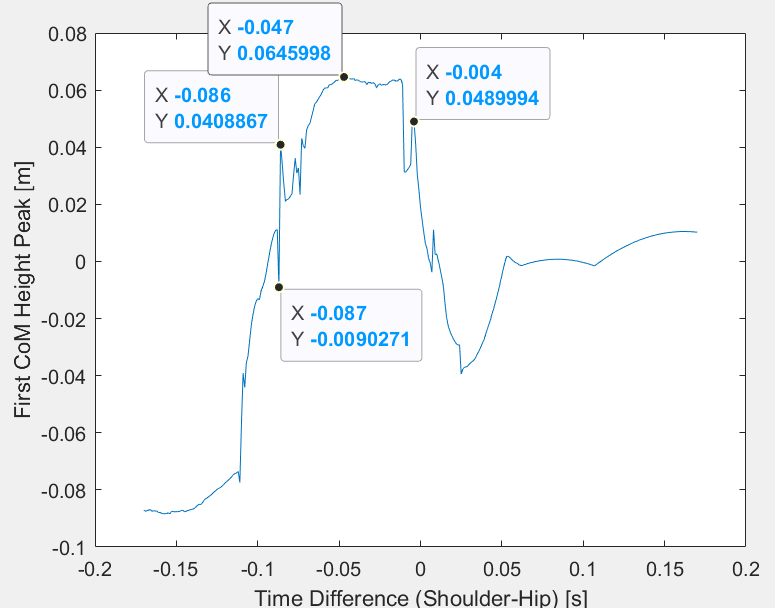
Arm is lighter than before – m5 = 25g; counterweight: m3 = 534-453.6g



Nov 28  
8k



4k



y-height for different time shifts, looking at the -0.087 vs. -0.086 especially (also did 0.0864 and 0.0865). Note divergence happens right around take-off point from a very small difference at the little hop point, suggesting some aspect of chaos/high-frequency resonance affects the system.

