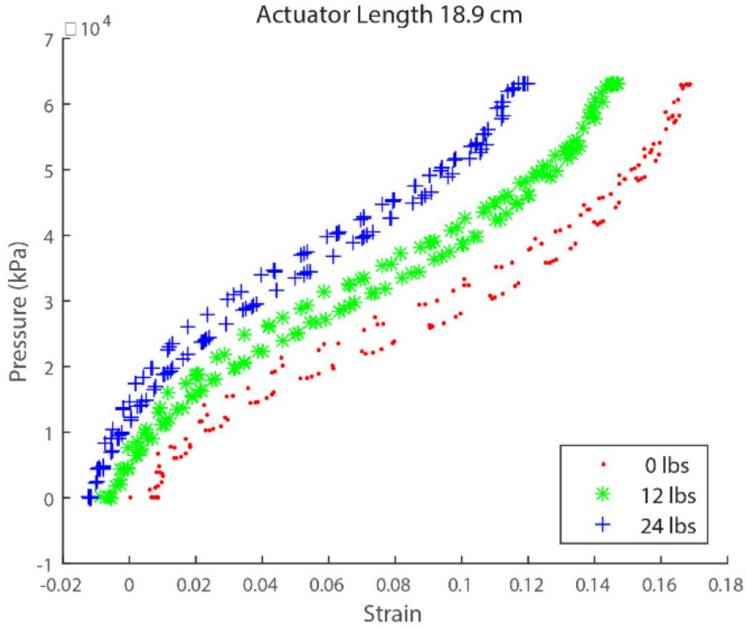
Festo Actuators

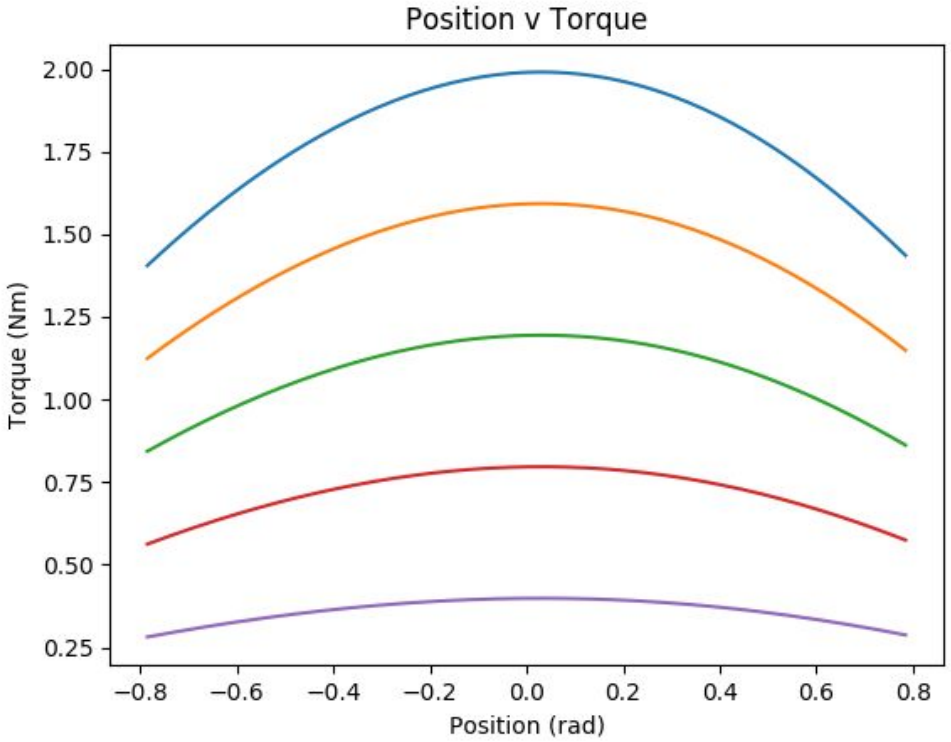
aka Buck trying to make pretty graphs

Festo Curves

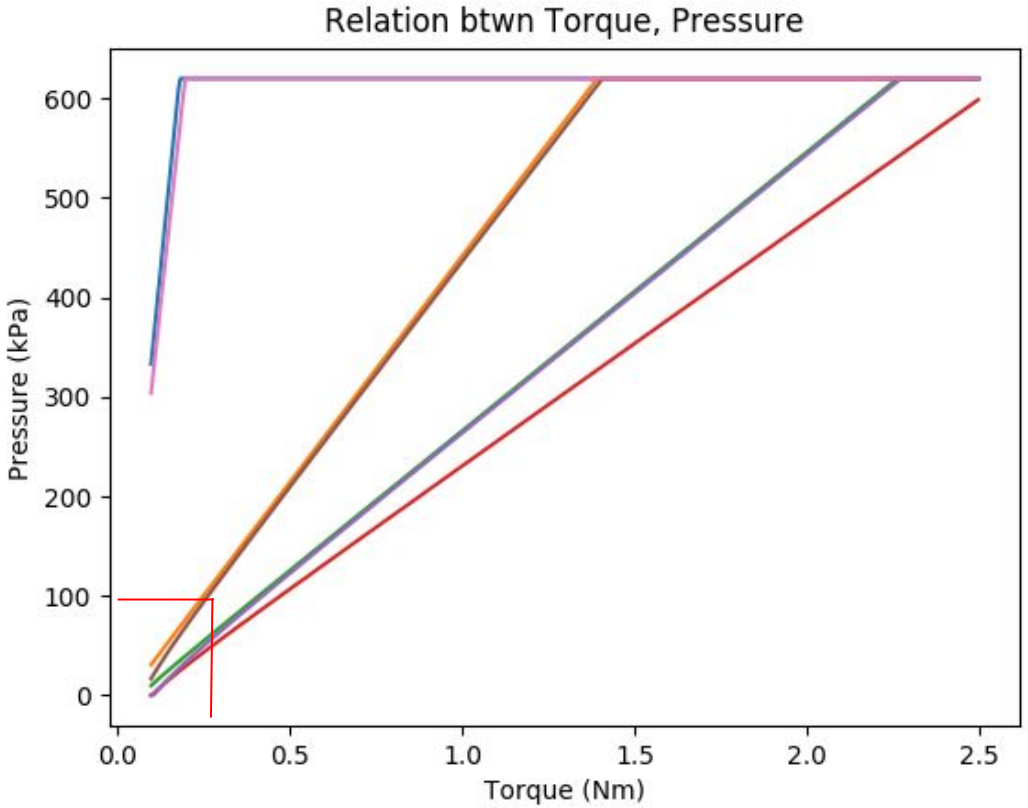


In practice, the change in length is small enough that its close to linear

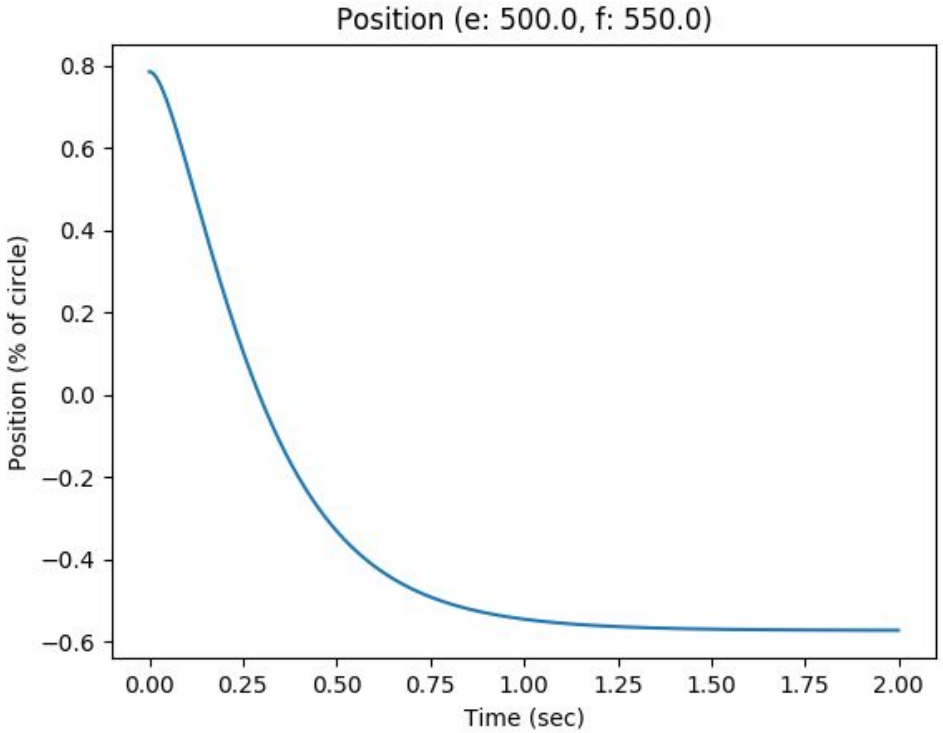
Torque for constant pressures



Are they linear enough?

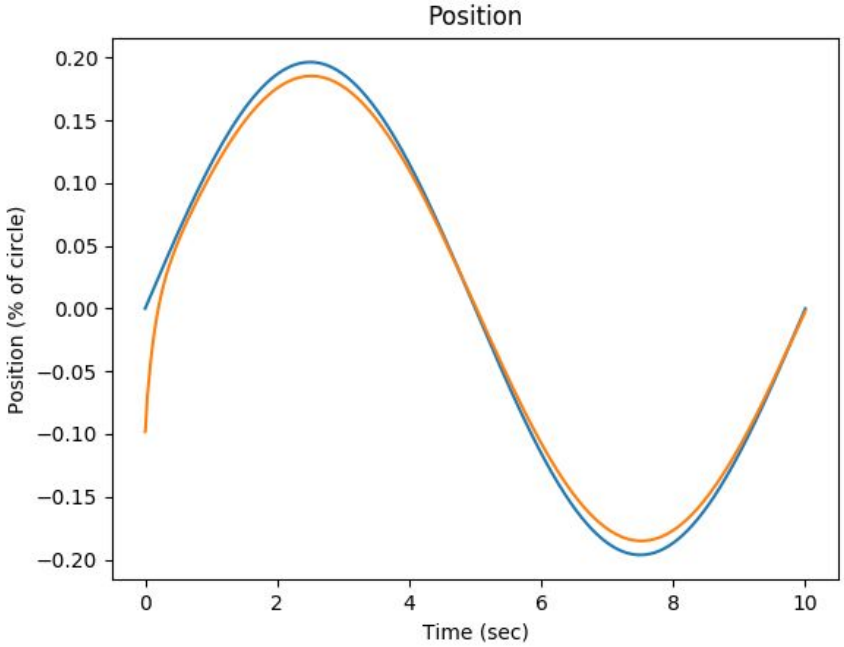


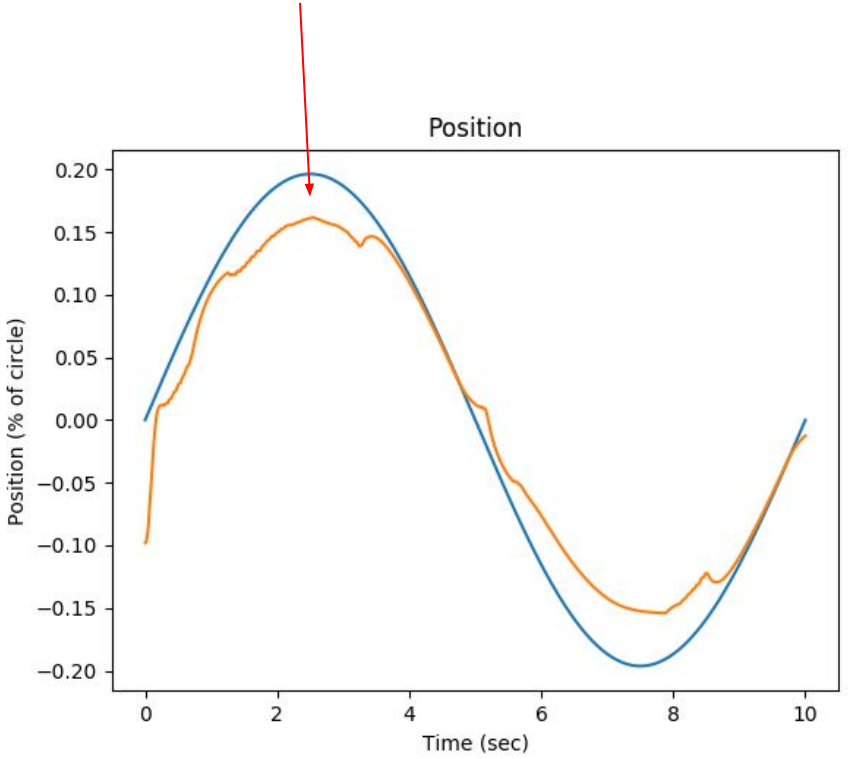
Constant Pressure



Trajectory Execution

Ideal vs. Non Ideal





Optimizing Controller

Use internal mass model to project actions forward in time

- Feedforward/computed torque
  - Relies on mass/damping model estimation, but should do better than proportional
  - Adjusts for when the controller updates at a slower rate
  - Slower calculation, but the controller updates slowly anyway

- Neuron networks, integrators or leaky integrators for parameter estimation
- Constant estimation useful for checking bounds on stability

Why does this matter?

- Neuron generation of trajectory (desired position) will be well executed
- Good model for control with antagonistic nonlinear actuators
- Data shows that the actuators should always have a small stiffness/overlap/antagonistic torque to be linear and effective
- Stability in a range of torques and stiffness allows for adjusting energy use/efficiency to compensate for weight without significantly changing dynamics