Team 5 - Gripper

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EGR 557

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**Parameter ID**

1. **Identify and discuss the materials you plan to use in fabrication. Decide who will be obtaining those materials and distributing them.**

The team plans to use fiberglass plate sheets, a flexible plastic sheet, and adhesives using the laminate technique for the prototype. Aman will be ordering the parts from Amazon and distributing them among the team members.

1. **Identify and Discuss the various parameters you plan to model in your simulation, including: - Actuator modeling, input signal specification, mass and inertia properties, link and/or joint stiffness, damping, friction - Discuss your plans for experimentally obtaining each of those values, and the model you would like to use for describing each phenomenon.**

|  | Awab | Borna | Aman |
| --- | --- | --- | --- |
| Rubber band strength |  |  | X |
| Material Stiffness | X |  |  |
| Motor characterization |  | X |  |

1. **Identify and Discuss how you plan to prototype your system and assign one person to do that**

Rubber Band Strength test: Different types of rubber bands will be purchased and load testing will be carried out to assess the stiffness of the rubber bands. Testing will also be carried out with different quantities of rubber bands to provide an average stiffness coefficient.

Material Stiffness: To test the material stiffness, The team will be testing the shear stress of the individual links. Prior to testing the laminate links, the will test a variety of materials, such as fiber glass and cardboard, to determine the ideal material for the application.

Motor Characterization: To test the motor specifications, the team will use weights on a bar attached to the servo pinion (standard assembly hardware will be used as weights). The weights will be gradually increased until the servo reaches stall torque.

1. **Identify and Discuss how you plan to collect system-level motion or force data, including: method (IMU, video, discrete joint sensors, force/torque sensing), and data extraction approach**
   * Motion capture for range of motion of the end effector.
   * FSR, Strain gauges, Resistive sheets, load cells can be used in a testing setup (through 3d printing).
2. **Identify and Discuss your plan for shared simulation tasks: - which of you will be updating the code, - adding model fitting routines, - filtering, interpolating and otherwise massaging input data.**

The team will collaborate on creating simulations from the collected test data. Each team member can create a system model of the part they tested. The data will be incorporated into the system dynamics code for plots and simulations. Using optimization the system model will be enhanced to achieve better performance.

1. **Finally, identify and discuss any reporting tasks that may be needed: compiling information into a report (may be combined with the simulation if using Jupyter)**

The team will be compiling the dynamics code as well as the code containing the laminate layers. In addition to the code, the test results will be included in the notebook (Jupyter).

1. **Split each of these tasks to the individuals on your team, and come up with at least one deliverable for each person for the remainder of the week**

Rubber Band Strength (Aman): Deliverables include types of rubber bands tested and their respective stiffness coefficients.

Material Stiffness (Awab): The deliverable will include a spreadsheet of various link bend angles versus the weight on one end of the link.

Motor Characterization (Borna): Deliverables include motor stall torque, motor speed, motor testing videos, and test parameter.