Updates: Friday, January 21, 2022  
- Kunal Nandanwar  
  
**1.1 MER Canvas Page Checklist:**

1. Professor added in MER Lab Teams channel
2. Installed Teams mobile
3. Teams notifications - turned on
4. Added Info in People Info Teams
5. Github profile - done
6. Github username sent to Prof – yet to receive content
7. Mendley Account – done - how to use it??
8. Requested for physical Key – request approved yesterday – will collect today
   1. Lab area canvas page – **Link (Not sure???)** + Form (Done)
9. Lab page updated – photo sent to Mr. James Akl – website updated
10. Read Graduate catalog

**1.2 MER Canvas Page Additional Materials:**

1. Robotics worldwide mailing list: link is not working
2. ROS, UBUNTU installed

**2.1 Research Papers - Reading:**

*Variable-Friction Finger Surfaces to Enable Within-Hand Manipulation via Gripping and Sliding (2018):*

1. Biological Inspiration, Finger Properties, VF
2. Visited Yale Openhand Project – read/analyzed different hand designs
3. 2DoF gripper, read About Control approach and implementation
   1. Control: non-linear behavior was observed, added feedforward term (function of

the current angle of the VF), open loop

1. Watched the video linked in the application for more clarity (9 different applications)
2. Future work: Multiple/asymmetric objects, closed controller, underactuated, higher DoF

*Within-Hand Manipulation Planning and Control for Variable Friction Hands (2021):*

1. Presented 3 vision-based within-hand manipulation methods for a variable friction hand, taken some cases/assumptions
2. Feedforward: weighted A\* with modified cost func, can be used in cases when smooth and fast executions are required and when
3. the accuracy is not a major concern
4. Feedback: provide high accuracy without requiring any planning, but it can cause chattering
5. Hybrid: combines advantages of FF+FB(requires planning, but can provide smooth trajectories and accurate results)
6. Future Work: ??Not Specified??

*Region-Based Planning for 3D Within-Hand-Manipulation via Variable Friction Robot Fingers and Extrinsic Contacts (2021):*

1. Moving Contact UP and Down
2. Pivoting
3. Watched video – link in MER lab application form
4. Motion Planning Problem formulation
5. cost function: minimize the contact region that is left outside of the goal region
6. Future Work: Variable Palm Width, larger/smaller objects, enabling sliding/ rotation for thin prisms

**Questions:**

1. Sources/links to control laws for each paper or maybe some flowchart

**3.1 Discussion with Teammates:**

1. Discussed the understanding of these research papers with Anujay.

**Meeting Notes/Suggestions:**

1. Try to find out limitations in each method/paper
2. Chattering, Non-holonomic systems
3. Moving to continuous space (from discrete) or maybe hybrid
4. Hierarchical RL??
5. Mark – Sushmitha Belede
6. Kunal, Anujay – Chintan Desai (idea discussions, planner codes) – do before Tuesday
7. Meeting: Tuesday (9:30am)