DLO Dataset Shortcomings

Papers

- [x] ICRA_2017_001 - Combining Self-Supervised Learning and Imitation for Vision-Based Rope Manipulation
- [x] ICRA_2021_001 - Deformable Linear Object Prediction Using Locally Linear Latent Dynamics
- [x] ICRA_2022_003 - Shape Control of Deformable Linear Objects with Offline and Online Learning of Local Linear Deformable Models

ICRA_2017_001 - Combining Self-Supervised Learning and Imitation for Vision-Based Rope Manipulation

Dataset shortcomings:

In the context of deformable linear object manipulation, one must first capture the object dynamics and this could be achieved through various means e.g. learning-based models [ICRA_2017_001], finite element models [], and latent space models [ICRA_2021_001].

Existing dataset do not provide test sequences that allows for proper learning of DLO dynamics. In fact, there seem to be a false assumption where all DLOs have dynamic linkage from end to end. In reality, a large portion of DLOs behave as **fluids** e.g. ropes and long cables. In fact, all DLOs start to behave as fluids if they are long enough. For example, in [ICRA_2017_001] the authors used a long rope that lays flat on table which is covered by a green cloth. The rope is long behaves much like a fluid rather than a dynamic system or object. Moreover, its configuration is mostly dictated by friction with the table cloth rather than its own dynamics. There are insufficient information the particular rope used such as length, elasticity, material, and weight per unit length. There are other factors that have significant effects on object dynamics i.e. ambient temperature and humidity.