

Underwater Soft Robot Modeling and Control with Differentiable Simulation

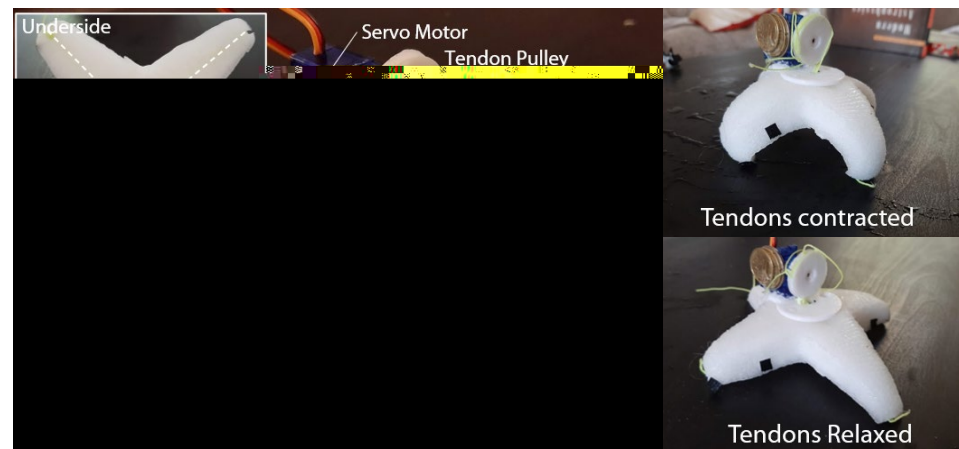
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1. Overview & Summary



- We present a **holistic** framework for modeling and controlling underwater soft robots;
- We show an algorithm that **iteratively** solves system identification and trajectory optimization;
- We develop a **differentiable** simulation model and show its power in narrowing the reality gap;
- We demonstrate the efficacy of our method on **a real underwater soft robot**.

2. Robot Setup & Fabrication



3. Simulation & Optimization

4. Experimental Results

- The robot travels **4x faster** compared to a handcrafted baseline.
- Convergence occurs after

5. Conclusion & Future Work

- Our pipeline allows for significantly improvement in performance and **narrowing of the sim-to-real gap**.
- The pipeline can be used interchangeably with **other simulators (hydrodynamic models)** and **robot systems**.

6. Acknowledgments

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