GRADUATE STUDENT RESEARCH SEMINAR SERIES (2019)

UTILIZING PASSIVE APPENDAGES TO IMPROVE MANEUVERABILITY IN AQUATIC ENVIRONMENTS

SPEAKER: BEAU POLLARD

Natural swimmers utilize vortex shedding from their fins and tails as their primary means of propulsion. Their tails and fins are actuated through direct muscle activation and/or passive interaction with the surrounding flow field. The appendage shape change from passive interactions with the surrounding fluid can alter the shed vorticities position and shape, thus altering the swimmer's locomotion characteristics. This change in shed vorticity from the passive appendages can lead to increases in swimming efficiency, speed, and/or maneuverability. Using simple hydrofoil shaped robots, I demonstrated that the addition of passive appendages significantly increased the robot's maneuverability for given inputs. Using a version of the panel method I was able to identify the changes in hydrodynamic moment of robots with and without tail segments, which provided a quantitative answer regarding why passive tails increase maneuverability.

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