

Abstract Submitted  
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**Performance characteristics of pitching flexible foil propulsors**

CODY BROWNELL, BRENDAN EGAN, MARK MURRAY, United States Naval Academy — Performance characteristics of flexible foil propulsors are studied experimentally. The project investigates the dependence of thrust and efficiency on foil elasticity, Strouhal number, and flow velocity. The experiments took place in a large recirculating water channel, using full span flexible propulsor models to approximate a 2D geometry. The propulsor pitched about a fixed axis at its quarter chord, with a six-axis load cell measuring the forces and torques on the shaft. Propulsive efficiency is found to peak at an optimum Strouhal number for each foil tested. Varying elasticity did not produce a similar local maximum over the sampled parameter space. The ensemble data will facilitate the engineering of fish-like propulsion systems for future application of this technology.

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