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Passive appendages improve the maneuverability of fish-like robots[1] BEAU POLLARD, PHANINDRA TALLAPRAGADA, Clemson University — It is known that the passive mechanics of fish appendages play a role in the high efficiency of their swimming. A well known example of this is the experimental demonstration that a dead fish could swim upstream. However little is known about the role if any of passive deformations of a fish-like body that could aid in its maneuverability. Part of the difficulty investigating this lies in clearly separating the role of actuated body deformations and passive deformations in response to the fluid structure interaction. In this paper we compare the maneuverability of several fish shaped robotic models that possess varying numbers of passive appendages with a fish shaped robot that has no appendages. All the robots are propelled by the oscillations of an internal momentum wheel thereby eliminating any active deformations of the body. Our experiments clearly reveal the significant improvement in maneuverability of robots with passive appendages. In the broader context of swimming robots our experiments show that passive mechanisms could be useful to provide mechanical feedback that can help maneuverability and obstacle avoidance along with propulsive efficiency.

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