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Caudal fin shape and swimming performance of Tunabot[1]
ALEXANDER SMITS, LIUYANG DING, Princeton University — Tunabot is a biomimetic robot developed at UVA to help understand the swimming performance of tuna, and the translation to the design on the next generation of underwater vehicles. To understand better the role of the caudal fin and its shape in determining the propulsive performance, the effects of caudal fin platform was examined by experiment. The cruise speed of the Tunabot was measured under free swimming conditions at a Reynolds number based on body length of 27,500 while varying the caudal fin shape from that observed for tuna to one that was rectangular with the same area, mean chord, and aspect ratio. It was found that the rectangular fin produced greater thrust at the same actuating frequency, resulting in about a 25% increase in swimming speed. This result may indicate that bio-inspired robots may permit better performance than biomimetic robots.

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