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The roles of tail and body angles on metachronal swimming performance[1] CHRISTOPHER PRICE, MITCHELL FORD, ARVIND SANTHANAKRISHNAN, Oklahoma State University — Freely-swimming crustaceans range from only a few millimeters to over a meter in body length, and some species are known to migrate across long distances. They swim individually and in large schools, and can rapidly maneuver in all directions using a swimming technique called metachronal paddling, which involves the sequential, periodic motion of closely spaced limbs. A number of factors, including body morphology and limb kinematics can affect metachronal swimming performance, and various species have been observed to flex their abdomen and tail as a way to vector the thrust generated by the paddling motion. Using a robotic paddling model, we examine how variation of the body and tail angles impact swimming performance, as well as affecting the momentum and angle of the paddling wake. Increasing the angle between the tail and the longitudinal axis of the body resulted in slightly increasing the angle of the wake, as well as slightly decreasing the total momentum of the wake, while changing the body angle resulted in larger changes in wake angle and swimming speed.

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