On the hydrodynamics of fishlike swimming: Anguilliform vs. Carangiform locomotion[1] IMAN BORAZJANI, FOTIS SOTIROPOULOS, St. Anthony Falls Lab, University of Minnesota — Comparing anguilliform and carangiform swimming experimentally is a great challenge due to issues such as obtaining 3D flow and pressure fields around the live fish, control over the live fish, etc. Numerical simulations can be a powerful tool to complement experiments in this respect. We carry out a systematic numerical study to compare virtual anguilliform and carangiform swimmers. Using simulations for tethered virtual swimmers we study the effects of Reynolds number (Re) on swimming performance. We found that the carangiform swimmers' efficiency increases as the Re increases while the anguilliform efficiency peaks in the transitional regime due to the difference in either kinematics or shape of the virtual swimmers. To study the effects of shape and kinematics separately, we perform a series of self-propelled simulations by prescribing the anguilliform kinematics on the carangiform body and vice versa. The computed results provide novel insights into the performance of each mode of swimming in various flow regimes and help reconcile and clarify experimental observations with live fish.

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