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Efficient kinematics for jet-propelled swimming SILAS ALBEN, University of Michigan, LAURA MILLER, UNC-Chapel Hill, JIFENG PENG, U. Alaska-Fairbanks — We use vortex sheet and viscous simulations and an analytical model to search for efficient jet-propelled swimming kinematics at large Reynolds numbers (1000 and above). We prescribe different power-law kinematics for the bell contraction and expansion. In the simulations, two types of efficient kinematics are found: a bell radius velocity which is a nearly linear function of time, and a "burst-and-coast" kinematics. The analytical model studies the contraction phase only, and finds that the efficiency-optimizing kinematics transition from a nearly linear bell radius velocity (similar to the numerics) for small-to-moderate output power to an exponentially-decaying bell radius velocity for large output power.

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