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Locomotion of a rotating cylinder pair with periodic gaits at low Reynolds numbers LINGBO JI, WIM M. VAN REES, Massachusetts Institute of Technology — We investigate the effect of periodic gaits on the self-propulsion of two side-by-side rotating cylinders at low Reynolds numbers. This cylinder-pair model serves as a prototype for engineered micro-swimmers due to its simple design and operation. To study periodic gaits, we impose a zero-net-rotation constraint on each cylinder for each swimming cycle. By numerically solving the Stokes flow around the cylinders, we can identify the optimal rotation patterns that enable the cylinder pair to travel the largest distance for a range of energy budgets. We extend this study to three dimensions by investigating the optimal swimming strategies for pairs of spheroids within a range of aspect ratios, and compare their performance to traditional Purcell swimmers and other locomotion strategies at low Reynolds numbers.

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