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Optimizing turning for locomotion LISA BURTON, Massachusetts Institute of Technology, ROSS HATTON, HOWIE CHOSET, Carnegie Mellon University, A.E. HOSOI, Massachusetts Institute of Technology — Speed and efficiency are common and often adequate metrics to compare locomoting systems. These metrics, however, fail to account for a system's ability to turn, a key component in a system's ability to move a confined environment and an important factor in optimal motion planning. To explore turning strokes for a locomoting system, we develop a kinematic model to relate a system's shape configuration to its external velocity. We exploit this model to visualize the dynamics of the system and determine optimal strokes for multiple systems, including low Reynolds number swimmers and biological systems dominated by inertia. Understanding how shape configurations are related to external velocities enables a better understanding of biological and man made systems. Using these tools, we can justify biological system motion and determine optimal shape configurations for robots to maneuver through difficult environments.

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