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Geometrical Performance of Electrocatalytic Nanomotors[1] AMIR NOURHANI, PAUL E. LAMMERT, VINCENT H. CRESPI, Phys. Dept., Penn State, ALI BORHAN, Chem. Eng. Dept., Penn State — We provide a general analytical expression for the speed of electrocatalytic nanomotors in terms of surface cation flux, interfacial potential and physical properties of motor environment in the linear regime and thin electric diffuse layer. We model the motor geometry by a prolate spheroid which covers a range of geometries from sphere to rod-shape and slender bodies. We obtain a functional that turns the surface cation flux distribution into a motive utility factor. For a spherical motor the kernel of the functional reduces to the first Legendre polynomial of the first kind and with increase in the aspect ratio of the motor, the kernel tends to give more significance to the cation flux near the ends of the motor and the motor velocity becomes less sensitive to the flux distribution around the equator of the spheroid.

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