

Abstract Submitted
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Snakes Out of the Plane¹ ANDREW MCCORMICK, BRUCE A. YOUNG, L. MAHADEVAN, Harvard University — We develop a new computational model of elastic rods, taking into account shear and full rotational dynamics, as well as friction, adhesion, and collision. This model is used to study the movement of snakes in different environments. By applying different muscular activation patterns to the snake, we observe many different patterns of motion, from planar undulation to sudden strikes. Many of the most interesting behaviors involve the snake rising out of the horizontal plane in the vertical direction. Such behaviors include a sand snake sidewinding over the hot desert sand and a cobra rearing up into a defensive striking position. Experimental videos of live snakes are analyzed and compared with computational results. We identify and explain a new form of movement previously unobserved: “collateral locomotion.”

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