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Large and limbless: the locomotion of snakes

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In efforts to understand snake locomotion, we consider one of their various gaits. By contracting and extending their bodies unidirectionally like a slinky, large snakes propel themselves in a straight line. In a combined experimental and theoretical investigation, we here report on the dynamics of a boa constrictor alongside the analysis of an n-linked extensible crawler model. Constraints on their locomotion are quantified and discussed, such as the elasticity, frictional anisotropy and abrasive wear of their skin. Also presented are certain snake behaviors that culminate in their tying themselves into knots.