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Locomotion of a bio-inspired crawler: stasis domains and sweeping processes

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The modelling of crawling locomotors is receiving increasing attention with the development of bio-inspired soft robots. In this talk we see how, in case of dry friction, the locomotion problem for a N-segments crawler can be restated and solved in the framework of rate-independent systems. This formulation emphasizes hysteresis, expressed by the presence of stasis domains, and provides an intuitive description of the motility properties of the systems, such as the key role of a directionality in the friction.