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Instability and maneuverability of a multi-legged robot[1] SHINYA AOI, Kyoto University — Our previous study showed that a centipede like multi-legged robot composed of many modules, each of which has one pair of legs, produces body undulations through a supercritical Hopf bifurcation of walking in a straight line with parallel bodies when the gait speed increases over a critical value or when the body segment joint stiffness decreases below a critical value (Aoi et al., PRE 2013, featured by Nat Phys 2013). So far, it is unclear if centipedes actively produce or resist body undulations during their locomotion and the previous study discussed the underlying mechanism responsible for the body undulations in centipede locomotion based on the robot experimental results and dynamic analysis using s simplified physical model. Furthermore, centipedes produce agile locomotion despite many legs being in contact with the ground during their locomotion, which may impede their agile motions. The present study investigated the relationship between the instability of walking in a straight line and maneuverability of the robot using a quick turn task and some evaluation criteria for maneuverability.

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