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Dynamic instability of a charged Ziegler's double pendulum.

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The exploitation of instabilities within solids and structures has gained a lot of attention in recent years [1], with instabilities now being embraced in design rather than avoided. One potential application arises for micro-robotics within biological environments, where dynamic instabilities can be used to generate motion [2, 3].

This presentation investigates the possibility of exploiting the dynamic instabilities of a constrained version of Ziegler's double pendulum, as imagined by Cazzoli et al. [4, 5], for micro-robotic applications. As shown in [6], a charge is introduced at the tip of the double pendulum, and the system is placed within, or in the proximity of, an ideal solenoid. The resulting interaction with the magnetic field is examined, to determine how electromagnetic effects influence the overall dynamics and whether they may provide a mechanism for controlling the motion of the device.

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References

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