

DYNAMICS OF A BRISTLE BOT

SPEAKER: CHANDRAVAMSI GANDRA

Vibration driven robots utilize periodic excitation of the internal masses to achieve directed locomotion. Such robots majorly find applications in inspection technology, rescue operations, and in medical devices where conventional means of locomotion is ineffective. Bristle Bot, popular as a toy robot, is one such robot with an interesting dynamic behavior. In this work different possible types of motion for a Bristle bot is explored and the mathematical conditions for the system to exhibit a particular type of motion are formulated. System of equations defining the motion are developed and solved numerically to study the dynamics of a Bristle Bot. Results indicate a transition in dynamic behavior of the system with the forcing frequency and the two frequency oscillations of the bot while exhibiting Slip-Stick locomotion. In addition, a direction reversal of the bot is observed at a threshold frequency. This phenomenon is particularly useful in medical devices for target drug delivery through narrow channels.

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