

A Topologically Inspired Path-Following Method with Intermittent State Feedback

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Abstract: Autonomous systems often operate in environments where state feedback may not be available, such as in anti-access and area-denial environments. In these environments, it is often required that an agent track a path, despite interruptions in state feedback. This has given rise to a class of Relay-Explorer problems, where an agent is tasked with switching between multiple operation modes, primarily depending on the availability of state feedback. Past works have established frameworks for developing dwell-time conditions, and path planning techniques to guarantee system stability, despite depending on the availability of state feedback. However, this work only applied to a very limited class of reference paths and feedback region geometries. In response to this limitation, developments have been made that advance a topologically inspired method for guaranteeing re-acquisition of feedback for nearly arbitrary geometries, in arbitrary dimensions. In this talk, this advancement in guaranteeing the re-acquisition of state feedback will be discussed along with related geometric considerations for the problem as a whole.

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