Safe and Robust Robot Maneuvers Based on Reach Control

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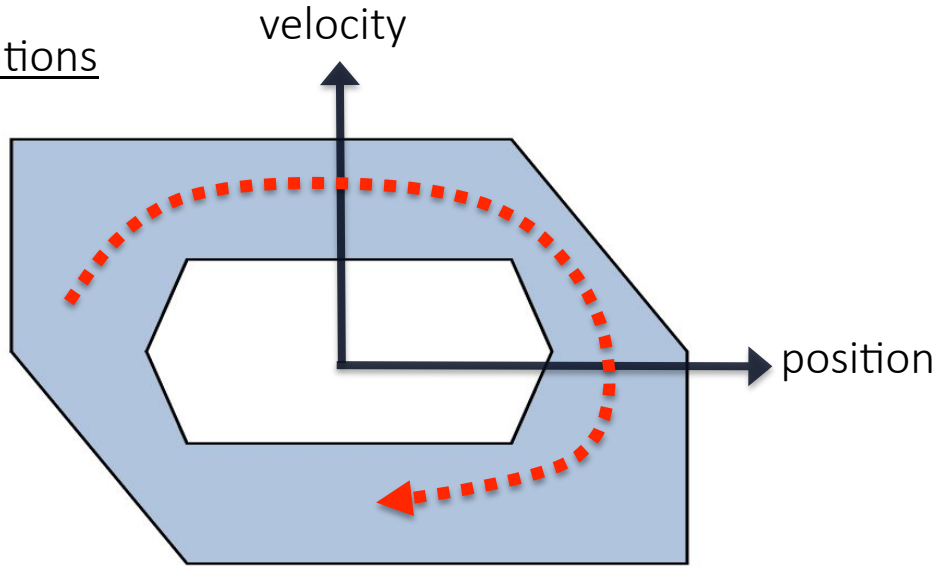
Introduction

Goal - Design provably safe controllers for executing complex control specifications

1) Safety constraints

2) Temporal logic specifications



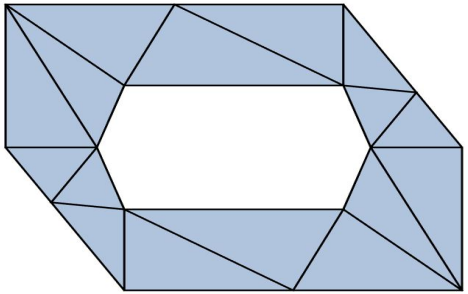
Motivating Example

Standard tracking (sinusoidal reference)

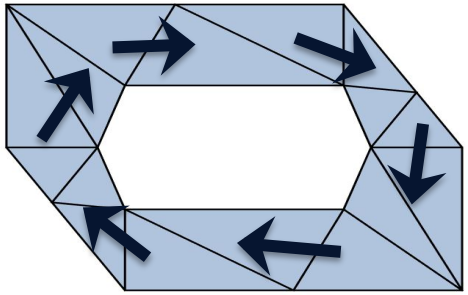
Hybrid Control Methodology

DYNAMIC SYSTEMS LAB

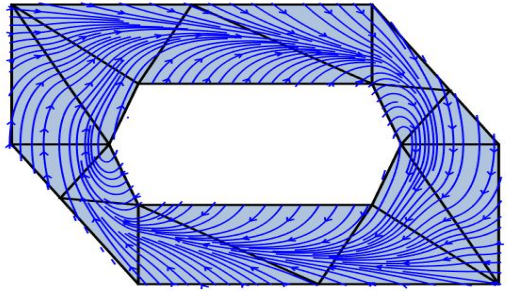
1) Triangulation



2) Sequencing of triangles



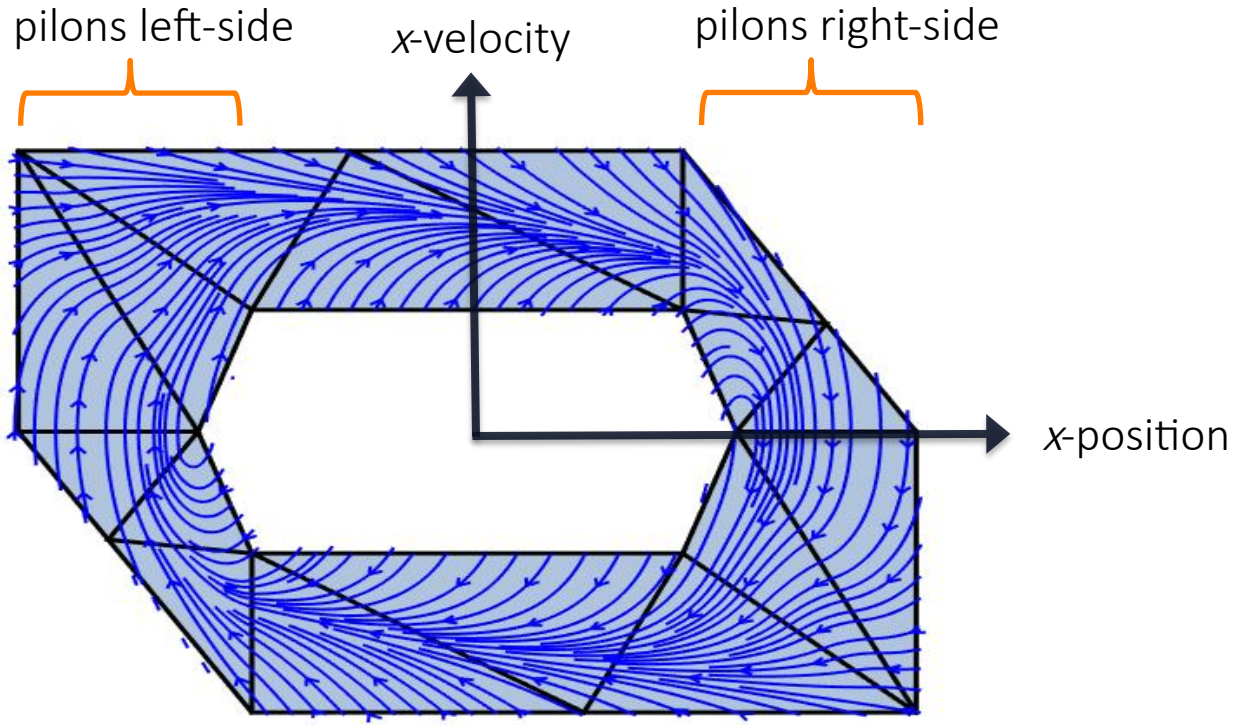
3) Low-level control synthesis (Reach Control)



M. Kloetzer and C. Belta, "A fully automated framework for control of linear systems from temporal logic specifications," 2008.

B. Roszak and M. E. Broucke, "Necessary and sufficient conditions for reachability on a simplex," 2006.

Resulting Design for Quadrocopter Maneuver



Robustness of Design

Proposed approach