Mathematics > Optimization and Control

Nonlinear adaptive trajectory tracking control of tethered kites

Jorn H. Baayen

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A novel tracking paradigm for flying geometric shapes using tethered kites is presented. Because of the one-to-one correspondence between turning angles and images of curves on a sphere it is possible to fly a given shape by tracking the associated turning angle. Based on this principle a Lyapunov-based nonlinear adaptive control loop is developed that needs control derivatives of the kite aerodynamic model only. The resulting controller is found to be robust when simulating against the Leuven-Heidelberg rigid body kite model, even under severe initial model mismatch.

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