# Real Results

## Torque-limited Simple Pendulum



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# Noisy Dynamics

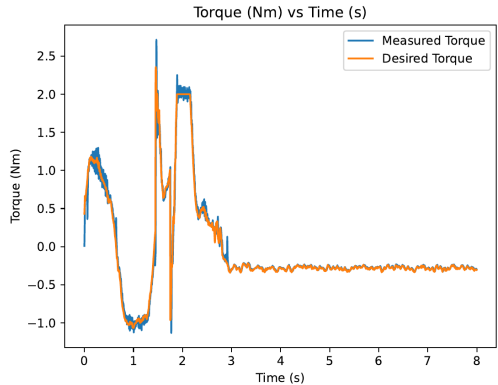- Initial condition for TVLQR control: x = [0, 0]
- Disturbance action: t ∈ [1.5,1.7]
- Result swing-up: Successful



Torque (Nm) vs Time (s)

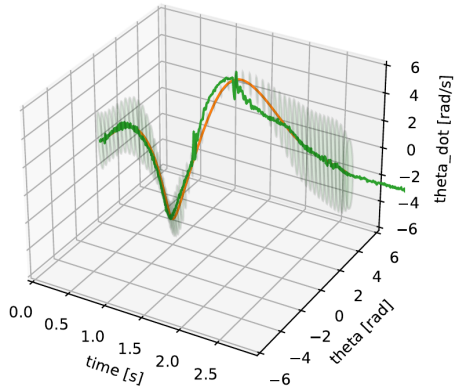3d resulting Funnel

videos/rvDIST2.mp4

- Initial condition for TVLQR control:
  x = [0, 0]

- Disturbance action:
  t ∈ [1.5,1.7]

- Result swing-up: Failure
  $x_f = [2.1, 5.5\text{e-}03]$



Torque (Nm) vs Time (s)
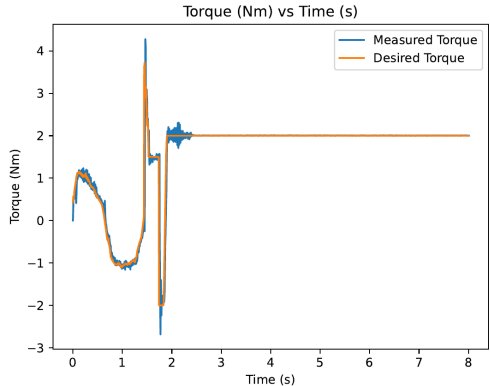
3d resulting Funnel
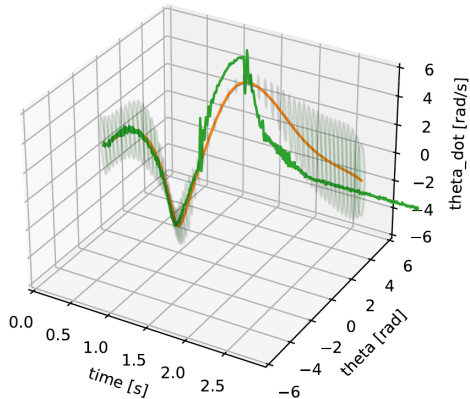
videos/rvDIST35.mp4

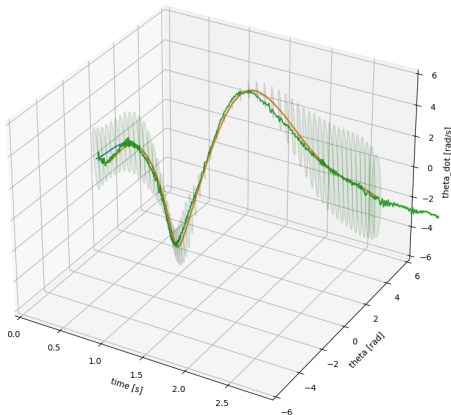# Different Initial Conditions

- Initial condition for TVLQR control:
  x = [1.7e-01,3.2e-01]

- Disturbance action:
  None

- Result swing-up: Successful



First ellipse and experiment IC
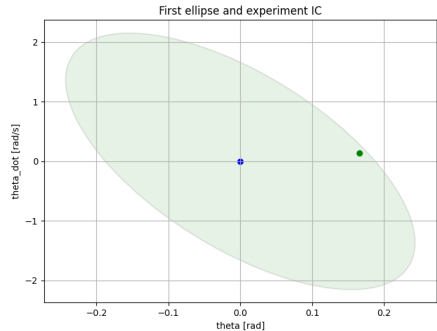
3d resulting Funnel

videos/rvLQR02.mp4