

Dual adaptive MPC using application-oriented set-membership identification

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Adaptive MPC

- ❖ Linear systems subject to state-space model uncertainties, additive disturbances
- ❖ Model parameters identified online using set-membership ID

Goal

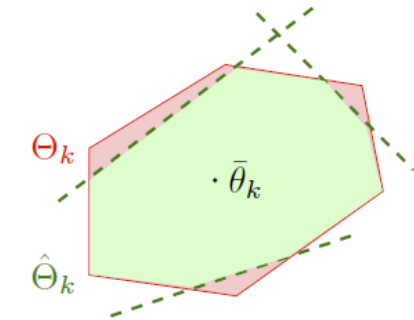
- ❖ Dual objectives: exploration and exploitation
- ❖ Performance-driven strategy to navigate the trade-off

Application-oriented dual control

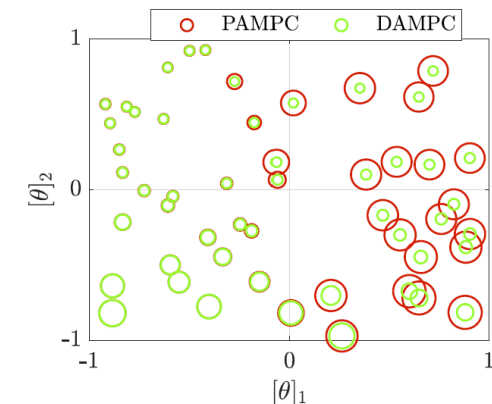
- ❖ Predict future uncertainty set as a function of the control inputs
- ❖ Use robust performance over predicted set as MPC cost

Simulation study

- ❖ Compare passive (PAMPC) and dual (DAMPC) exploration using a Monte Carlo approach
- ❖ Lower closed loop costs for DAMPC: active exploration



Predicted constraints on θ



Closed loop cost \propto Area