MPC Formulation for Obstacle Avoidance in UAV

Project Summary

The goal of this project is to formulate a model predictive control (MPC) algorithm for obstacle avoidance in unmanned aerial vehicles (UAVs) that operate in a restricted hight.

Project Type

- BA Thesis (3 months)
- MA Thesis (6 months)
- Praktikum (3 months)

Required Qualifications

- Programming skills in Matlab or Python
- Knowledge of MPC is a plus.

Contact

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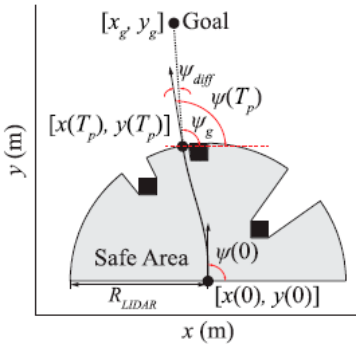
Detailed Description

The MPC formulation is developed to navigate an UAV from its initial position to a target position safely. First, a cost function is formulated to obtain the shortest path to the target position. Second, a region partitioning approach is used in conjunction with the MPC to formulate the obstacle free region over the MPC prediction horizon. The algorithm will be executed on the jMAVSim simulation environment.



Taken from the reference.

References

- Jiechao Liu, Paramsothy Jayakumarb, Jeffrey L. Steinc and Tulga Ersal,"A nonlinear model predictive control formulation for obstacle avoidance in high-speed autonomous ground vehicles in unstructured environments", VEHICLE SYSTEM DYNAMICS, 2018, VOL. 56, NO. 6, 853–882