

Kapitel 1

Description of software

A brief description of the basic matlab-files used in simulations in matlab.

mpc1.m: With given optimal values α^* and T^* , computes α and T , taking constraints into consideration (rate constraints and forbidden sectors).

mpc2.m: As mpc1, but α^* and T^* are computed by `opt_qp_f.m` with a given τ (from control system).

mpc3.m: MPC algorithm calculating α and T . Assuming reference value τ given. Cost function: $\sigma(Bu - \tau)$. Constraints: forbidden sectors. Rate constraints approximated by circle.

opt_qp_f.m: Function that with a given τ computes the optimal values T^* and α^* . Used by mpc2.

forbiddenSectors.m: Function making the forbidden sectors for the 8 propellers on CyberRigI, and stacking them. The result is on the form: $Ax \leq b$.

removeLine.m: Converting two polytopes into one (removing the line between them).

poly2Ab.m:

Function that takes in a poly (from `approxSector.m`) and return A and b on the form $Ax \leq b$.

Written by others:

approxSector.m: Cuts out a sector of a circle centered at 'center' and with radius 'radius'. The polytopes returned forms an inner approximation of the the remaining part of the circle.

lqrcVertices.m: On line 95: put in your current directory.

GBT: Geometric bounding toolbox. To be included to your matlab path.