PATH PLANNING SAVE TRAJECTORY
AND CONTROL HELICOPTER AUTOROTATION
USING MODEL PREDICTIVE CONTROL

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ABSTRACT

Autorotation helicopters is a difficult maneuver in the event of problems with the engine driving the main or tail rotor. Autorotation stages can be done in order to properly and perform a safe landing, it is necessary to control combined the collective and cyclic control with careful by the pilot. Autorotation flares are steps that determine the success of landing the helicopter safely. At this stage a combination of collective and cyclic control should be able to do the braking chopper speed to zero while maintaining the direction and speed of the main rotor plane is still left to do landing safely. This research, planning safe trajectories autorotation helicopter using Model Predictive Control that is able to predict the dynamics of the plant and is able to handle the non-linear dynamics plant. By using an internal model of the plant, the Model Predictive Control will do the optimization error between the planned trajectory with a predicted plant output and generating control signals to minimize error. Model Predictive Control is very well used in planning autorotation helicopter landing, as shown near zero velocity (forward and down speed ≤ 5 m/s) when the helicopter hit the ground to follow a predetermined path. By using the method of MAE (Mean Absolute Percentage Error) obtained mean error forward velocity 4.625 and mean error descent velocity 3.792 respect to set point.

Keywords: Autorotation, Model Predictive Control, Collective Control