

Abstract – modeFRONTIER 2012 Users' Meeting

Title → Enhancing MPC based Motion Cueing algorithm using modeFRONTIER

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Driving simulators are widely used in different applications: driver training, vehicle development, and medical studies. To fully exploit the potential of such devices, it is crucial to develop motion control strategies that generate realistic driving feelings. This has to be achieved while keeping the platform within its limited operation space. Such strategies are called motion cueing algorithms. A recent implementation of a motion cueing algorithm is based on Model Predictive Control technique. A distinctive feature of such approach is that it exploits an optimization procedure at each step based on a detailed model of the human vestibular system, and consequently differs from standard motion cueing strategies based on washout filters. In this approach the MPC technique is used to compute the platform positions that best reproduce the desired perception in the platform. The nature of the MPC techniques does not allow to get an explicit description of the control action, hence it is not possible to minimize the perception error for any possible maneuver.

In order to minimize these perception errors, exploring the entire set of tuning parameters and for a large set of maneuvers, is a complex optimization procedure, even more so due to the amount of parameters and the amount of objectives.

The solutions of this minimization problem are very useful to best tune the cueing algorithm and to best reproduce in platform the vehicle behavior.