Summary

During the October 16th meeting, we focused on discussing the *General Safety Framework 2019* paper. I began by presenting the problem statement: ensuring that learning-based controllers operate safely while learning policies during the training process. I started with Equation 1, which describes the system dynamics with a disturbance term. However, for Equation 2, where the dynamics shift to the trajectory, the variable *s* was unclear to me. Although I explained it as time, I admitted that this needs further clarification.

We then discussed Proposition 1, which addresses how the disturbance is a subset of a specific set *D*. I couldn’t fully explain the proof of this proposition, but Marek provided some explanation. However, both Momtaz and I still need to deepen our understanding. I then proposed that the disturbance could be treated as a function of the states, but my explanation of Proposition 1 felt overly simplistic. Dr. Yoon suggested that I should understand the proposition in more detail. Dr. Petrik also contributed by discussing the disturbance set further and noting that the notation in the paper could be improved, though overall, I still appreciate the paper.

When discussing Equation 5, I was confused, especially regarding the infimum of the *l* function with respect to time. At that point, I didn’t fully understand the role of zero and positive time, but I now know we are searching for the lowest value of *l* relative to the trajectory.

The main discussion revolved around Equation 6. Marek talked about how the min-max and max-min strategies are equivalent in this context. I commented that it seems as if both players act simultaneously, but Ola mentioned that the system is decoupled. Dr. Yoon started to contribute, but was interrupted by a conversation between Dr. Petrik and Dr. Begum, so he didn’t continue.

Although many attendees seemed eager to conclude the meeting, Marek became more intrigued by the paper, particularly with its Bayesian model and disturbance considerations. As a result, we extended the discussion. I also mentioned a 2024 paper by the same group, where they propose a different approach to the Hamilton-Jacobi-Isaacs (HJI) equation, suggesting that the switching mechanism in the current paper might not be ideal, and that we could explore alternatives.

Next week, we plan to continue discussing this paper.