# Thesis (MA/BA)

## Optimizing Latency in Multi-Effect Chain Systems through Parameter Generation using Mathematical Optimization

In modern vehicle systems, the minimization of communication latencies is crucial for ensuring optimal performance and responsiveness. Effect chains, which facilitate the flow of information and control between different components, are integral to these systems. However, with the increasing complexity of modern vehicles, numerous effect chains operate simultaneously, posing challenges in latency minimization.
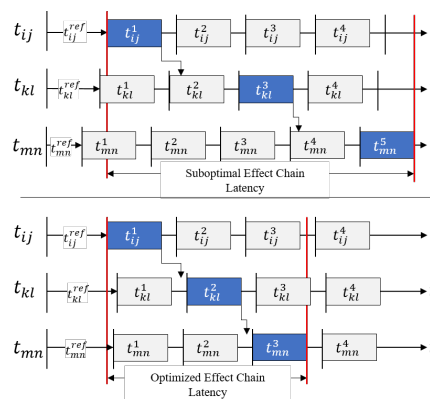


This thesis project builds upon an existing work where a method for minimizing communication latencies using mathematical optimization was developed for a single effect chain. The objective now is to extend this method and explore its application to multiple effect chains concurrently. By synthesizing communication parameters through mathematical optimization, we aim to further enhance the latency minimization capabilities of the system.

## Your tasks in this thesis will include:

- Familiarize yourself with the existing method for latency minimization in a single effect chain
- Conduct a comprehensive literature review on latency minimization techniques in multi-effect chain systems
- Design and implement an extension to the existing method to enable latency minimization for multiple effect chains simultaneously
- Develop mathematical models and algorithms for synthesizing communication parameters across multiple effect chains
- Evaluate the performance of the extended method using relevant metrics and datasets
- Document your work and present the findings clearly and concisely

## Requirements:

- Background in mathematical optimization techniques and algorithms
- Proficiency in Python, C++
- Interest in distributed systems, vehicle systems, and optimization

## Contact

Please read our Instructions for Applications.

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