TU Clausthal

Kolloquium zur Masterarbeit

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„An Approach for Non Cooperative Trucks in Vehicle Platoons"

The development of the world economy leads to an increasing demand for freight transport, in which road transport is still the most important mode because it accounts for the majority of the market share of freight transport. Due to the strong dependence on fossil fuels and manual labor, as traffic intensity increases, pressures on infrastructure, energy usage, labor costs and an increase in environmental pollution will be higher than ever. Therefore, a network-wide coordination system for vehicle platooning is developed and promises to address these important challenges. Aimed at reducing fuel consumption, this technology focuses mainly on heavy-duty vehicles and is known as truck platooning. By adjusting routes, speeds and plans, the trucks are coordinated and arranged to travel with small inter-vehicle distances to reduce aerodynamic drag and thus, reduce overall fuel consumption and greenhouse gas emissions. Numerous tests conducted around the world have shown the potential to reduce fuel consumption by up to 21% and the ability to save operating costs of truck platoons. However, to fully reap these benefits in the initial phases of technology deployment, a strategy to form platoons in an operational context is required. On the other hand, although there have been extensive studies on the technological feasibility, market access as well as the respective benefits and economic potential of the platooning system, some research areas such as coordination strategies, operation methods, the benefit-sharing policy of trucks in platoons are not widely researched. In the future, the crowded truck platoons with the participation of many self-interested truck fleets from different transport companies will become a competition for benefits with poor cooperation if we do not provide a reasonable model of platoon coordination. From here, the problem of coordinating of non-cooperative truck platoons was formulated. The main goal of this thesis is to investigate suitable splitting policies of non-cooperative platooning between fleets for the available cost reduction of those formed platoon, based on the global optimum solution. The non-cooperative platooning coordination problem is defined as a non-cooperative game, called the non-cooperative vehicle platooning problem.

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