

## عنوان مقاله:

A PDE-based approach to internal and string stability analysis of large-scale bi-directional vehicular platoons

## محل انتشار:

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## خلاصه مقاله:

This paper considers the asymptotic zero tracking error as well as string stability of large-scale automated vehicle convoys (LAVC). Both centralized and decentralized bi-directional network topologies are investigated. A double integrator dynamical equation is defined to describe the 1-D dynamics of automated vehicles (AV). A centralized / decentralized controller which employs the relative displacement and velocity compared with the backward and forward AVs is defined for all following AVs. Since the dynamical equation of LAVC is hard to be analyzed for internal stability, a PDE-based approach is introduced to decouple and reduce the closed-loop dynamical equation. According to this approach, we will be able to decouple the dynamical equation of all AVs individually based on the error dynamics. After simplifying the dynamical equation of LAVC, the conditions satisfying the internal stability of centralized and decentralized networks are obtained. After that, algebraic analyses in frequency domain will able us to find the constraints on control gains guaranteeing the string stability. Simulation and experimental results are available to describe the merits of this algorithm.

## کلمات کلیدی:

.Large-scale vehicular platoons, Internal stability, String stability, PDE-based approach, Decoupling

## لینک ثابت مقاله در پایگاه سیویلیکا:

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