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Review of Ing. David Vošahlík dissertation thesis with title "Advanced Algorithms for Vehicle Dynamics Control"

In general, the thesis is well written and composed and has a logical flow between sections and parts of the research work. In the below section follows my review on the thesis work with some considerations on how the thesis could have been improved.

Subjects' relevance to current needs of the scientific community

The subject of electric mobility and self-driving vehicles needs further research. Here in this work important areas have been studied such as; control systems for the ever more over actuated vehicles, which is a result of electrification and self-driving technology push, the need to know where the maximum grip level is which improves vehicle safety, finding suitable and computational cost effective planning algorithms for self-driving vehicles.

Fulfilment of main objectives

The main objectives of the thesis have been to focus on the drive-by-wire technology in future electric and self-driving vehicles. Here, through a logical and well written disposition in the thesis, the three areas of study namely, motion control of vehicles, tire-to-road estimation and vehicle trajectory, have satisfactorily met the main objectives of the thesis work.

It is however usually a custom to clearly state the research questions or hypothesis that has been worked on during the thesis, as well as the process on how these relate to the papers written and how they have emerged in time during the PhD students work. This is not presented in the thesis.

Appropriate use of methods

The PhD student has shown ability to use both experimental and simulation-based methods as well as theoretical reasoning to analyse and evaluate

proposed algorithms. It has been implemented in a sound and well-structured manner.

For better validity of the thesis results a validation of the two-track or double-track model should have been presented as well as the tuning results of the model.

The scope and width of the state-of-the-art in the field could have been elaborated on more in the PhD thesis as well as in the scientific papers published since some important research works have not been acknowledged. Here, the below reference is a good overview to help in this regard:

Johansen, T. A., & Fossen, T. I. (2013). Control allocation—A survey. *Automatica*, *49*(5), 1087–1103. https://doi.org/10.1016/J.AUTOMATICA.2013.01.035

Main results and contributions of the work

In my view the main result of the thesis is the proposed way of performing the traction allocation along with the proposed and needed estimators for the optimal slip ratio. This is an interesting approach that could be further expanded on for other vehicle configurations as well.

The work's impacts for further developments of science

As also stated by the PhD student in the future work section this research has some potential future areas to further explore when it comes to lateral vehicle dynamics control as well as other vehicle configurations.

Concluding remarks on thesis fulfillment of conditions of a creative scientific work

The author of the thesis proved to have an ability to perform research and to achieve scientific results. I do recommend the thesis for presentation with the aim of receiving a Ph.D. degree.

Kind regards,

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