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Review of the PhD thesis of Ing. Pavel Otta for the title Doctor of Philosophy at CTU FEE.

I have had the privilege of reviewing the dissertation thesis Ing. Pavel Otto has submitted for obtaining the title of Doctor of Philosophy at CTU FEE, and it has been a really pleasant experience to read the thesis.

Reducing emissions and fuel consumption is beneficial both from an environmental and an economical perspective. The candidate clearly addresses these important goals and methods to achieve them are presented in the thesis. Problem statements, models and algorithms are developed for solving the task. Road topography, speed limits, and Signal Phase and Timing (SPaT) information of signalized intersections are taken into account in the problem formulation and efficient algorithms are developed, using appropriate methods, for computing optimal speed profiles.

The thesis is well-structured and the progression of the theory in the thesis is significant. The literature review is comprehensive. Existing research are surveyed thoroughly and this helps the reader to understand the relevance and the context of the results in the thesis.

In summary, the thesis is well-written, the quality of the research is high, and the scientific contributions are significant. The candidate addresses successfully all three challenges presented in the introduction. I have no hesitation in recommending the thesis for acceptance.

Comments and questions

1. It is common that the solution shows oscillating behavior when using the optimal control problem formulation (1.6), i.e. with speed in the denominator in the right-hand side of (1.6b). Has this phenomena been observed in simulations?

2. In Equation (2.7), a gravity term is added. There are no examples of the road profiles used in the thesis. How do different types of road profiles affect the solution?

3. In Figure 2.2, the four driving modes in (2.14) are illustrated, motivated by the behavior of the solution in Figure 2.1. Are there other possibilities than these four modes?

4. In Section 2.7, Signal Phase and Timing (SPaT) information of signalized intersections is used, but the relations to previous works are not discussed in this section, and only a couple references are mentioned in the introduction of the thesis. What are the relations to previous research?

5. In Section 2.1, the speed is substituted by quadratic speed, i.e., q=v^2. Is there a physical interpretation of equation (2.6)?

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.

Yours faithfully

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Linköping, March 18th, 2024

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