

Title: Optional Activities in Scheduling

Author: Mgr. Marek Vlk

The proposed work integrates scheduling systems and the use of the optional activities concept. Thus, the primary areas of study include production planning, CP models, ILP, and MAPF scheduling methodologies. With the idea of optional activities, the author concluded all of that topics.

I may say that the topics and their grasp are contemporary and non-trivial issues. The work is written in an acceptable straightforward manner and progresses smoothly in terms of definition and complexity. The literature mentioned here provides a suitable theoretical foundation and an overview of the current situation.

The beginning illustrates the significant role of scheduling. The motivations and author's original works are mentioned as well. Finally, there is a paragraph outlining the work's structure.

The second chapter discusses how to solve the production scheduling problem with sequence-dependent non-overlapping setups. The main problem is stated in the beginning, along with relevant literature. Experiments validate the formulation of ILP, CP models, and the heuristic method.

The third chapter examines multi-agent path finding (MAPF) and its expanded variations with weighted and capacitive arcs. The scheduling model and generalised MAPF are presented after the specified problem. The chapter closes with experiments and an insufficient discussion of the resulting graphs.

In the fourth chapter, the author explored the problem of joint routing and scheduling of time-triggered traffic in time-sensitive networks.

The following questions arise:

- How were the experimental instruments and parameters chosen?
- Did this decision have an impact on the experiment's outcomes?

I have no major criticisms of the work; nevertheless, the author might dedicate more attention to the presentation of outcomes and discussion, such as restricting used techniques in terms of applicability or efficacy, comparison with other approaches, and so on. Unfortunately, the author did not adhere to the content structure's purity and thus draws unnecessary attention to the fact that specific chapters are based on conference papers, typically more succinct, and others on pieces approved in impacted journals.

Summary:

The work of Mgr. Marek Vlk is written with sufficient clarity and correctness and incorporates the author's non-trivial original results. Theoretical findings are presented and illustrated in a suitably skilled manner. The author's scientific findings were published in the impacted journals (Q1 and Q2 rank) and as conference papers. The author has demonstrated his capacity to conduct scientific research, so I believe that the submitted work is entirely sufficient to be recognised as a dissertation, which, along with a successful defense, forms the foundation for conferring a Ph.D.

In Hradec Králové, 17.9.2021

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