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Review of Habilitation Thesis

Reliability Theoretical Approaches for Organization of Selected Traffic Processes

submitted by Dr.-Ing. Reiner Keil
appointment of Scientific Council of Faculty PEDAS, University Zilina, 16.3. 2016

1. Main results

The submitted habilitation thesis covers in a comprehensive way the modelling approaches of reliability metrics in transport systems. The author proves his own original scientific contribution by the enlargement of the system oriented analysis of several types of transport processes for material and information with mathematical reliability models. The definition of system reliability as probability of working under specific maintenance methods builds a bridge to the application of the theoretical framework. For this reason the author was able to use the presented methods in project cooperation with companies (see [89] and CV). The analysis of reliability models for multi agent systems contributes to the recent ongoing research for distributed software architectures.

2. Comments and Questions

At the beginning of the thesis the author gives a comprehensive overview about the scientific state of the art. At page 3 the definition „... *product of traffic logistics is the change of location at the instant of time of taken over traffic object x (object resp. message) of the condition B of source of traffic to drain of traffic in the duration T with a performance quality (reliability) Z at a price P. "* is given. At page 40 in formula (79) the duration T is implicitly part of the reliability Z via the transport speed v. **Question 1:** From this follows, that T and Z are not independent (redundant) parts of the "transport product"?

In chapter 3 the author deeply analyses the system reliability with given structures as the live time probability for the cases with and without maintenance for different transport systems. The models are derived in detail which is the main original contribution. The **Question 2** is, why in opposite to the common used probability based definition the transport reliability in formula (79) is a mean value calculation (*"middle transportation speed v_m"*). This seems to be problematic for the transport of critical goods.

In chapter 4.3 the author discusses recent multi agent systems. **Question 3:** How relevant is a structure-independent reliability P(k of K agents alive) for loosely coupled multi agent systems?

The most recent cited work is from the year 2011. **Question 4:** Are there relevant new scientific results?

3. Recommendation

The level of domain specific overview, systematics and original contributions of the submitted thesis fulfils the requirements for a habilitation thesis. Therefore I recommend the scientific council of Faculty PEDAS, University of Zilina to approve the habilitation work.

Salzburg, 29. 4. 2016

V. C.

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