

Predavanje dr. Andreas Schöbel, TUW:

Kronecker Algebra-based Deadlock Analysis for Railway Systems

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ABSTRACT

Deadlock analysis for railway systems differs in several aspects from deadlock analysis in computer science. While the problem of deadlock analysis for standard computer systems is well-understood, multi-threaded embedded computer systems pose new challenges. A novel approach in this area can easily be applied to deadlock analysis in the domain of railway systems. The approach is based on Kronecker algebra. A lazy implementation of the matrix operations even allows analysing exponentially sized systems in a very efficient manner. The running time of the algorithm does not depend on the problem size but on the size of the solution. While other approaches suffer from the fact that additional constraints make the problem and its solution harder, our approach delivers its results faster if constraints are added. In addition, our approach is complete and sound for railway systems, i.e., it generates neither false positives nor false negatives.