## Dr hab. inż. Andrzej Karatkiewicz

## Deadlock-Prone Circuits in S3PR Petri Nets

Deadlocks are usually the undesired situations that block the functioning of a concurrent system, e.g., an operating system, an embedded control system, or a flexible manufacturing system. A well-known and popular approach to deadlock detection in parallel systems is based on analysis of the resource flow graphs. The presence of a deadlock implies that there exists a cycle in such a graph, meaning a circular wait. However, such a cycle is a~sufficient condition of a deadlock only in some restricted cases (e.g., there should be a single instance of every resource). In general situations, a cycle in a resource flow graph is only a~necessary condition of a~deadlock. In this paper a~notion of a deadlock-prone circuit is introduced, allowing to catch the deadlocks in more general situations than the cycles in the resource flow graph allow.