Petri net synthesis from labelled transition systems and from languages

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Net synthesis can be understood as an algorithmic procedure aimed at constructing a Petri net structure from a specification of its intended or desired behaviour, given typically in the form of a transition system or a formal language. The procedure has to decide whether such a specification can be realised and, if the answer is positive, deliver as efficiently as possible a Petri net with the specified behaviour. Such a Petri net is then correct-by-construction, making net synthesis an attractive alternative to the design-and-verify approach to building concurrent and distributed system. If, however, the specification cannot be realised in full, the synthesis procedure is expected to deliver a Petri net approximating the specified behaviour in an optimal way. In this talk we survey the techniques of Petri net synthesis from labelled transitions or from languages and discuss some of their applications to process mining and the supervisory control of discrete event systems.