

Petri nets modeling of a real world manufacturing processes

Abstract

Every company strives to increase their profits. One of the key factors in ensuring the profits is effective utilization of manufacturing resources through application of efficient planning and scheduling approaches. These two main approaches are closely related to the manufacturing processes in a flexible manufacturing system (FMS) which are known as process planning and production scheduling. Process planning is refers to a process plan which is generated for each part to be manufactured in a manufacturing system (Wang and Li, 1991). The process plan specifies operations to be performed and their sequence, required resources and process parameters of each operation. On the other hand, production scheduling determines the most appropriate moment to execute each operation for the planned production, taking into account the due date, a maximum resource utilization, etc., in order to achieve high productivity in a manufacturing system (Kempenaers et al., 1996). One of the objectives of this work is to develop the process models, to help the definition of production processes. These models allow focusing on the second objective, which is to implement an integrated process planning, to specify the operations to be performed in manufacturing a product; and production scheduling, to estimate a start time for the particular operations to be performed in the case of manufacturing an automotive spring product. This chapter concentrates on the modeling of production processes using Petri Nets (PN) in order to understand the dynamic behavior of machine and production processes. Our case study is automotive spring production.