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Book review

Planning and Scheduling in Manufacturing and Services, by M.L. Pinedo, Springer-Verlag, New York, 2005, 506 pp., £46 (ISBN 0-387-22198-0).

As the title says, this book focuses on planning and scheduling applications in manufacturing and services, selecting the most important and representative models and methodologies from the enormous available literature in this field.

The book is structured in four parts.

- Part 1 describes the general characteristics of scheduling models in chapter 1, while in chapters 2 and 3 the basic characteristics of manufacturing models and of service models respectively are presented, including machine environments and service settings, processing restrictions and constraints, as well as performance measures and objective functions. Manufacturing and service applications are developed in detail in part 2 and part 3 of the book.
- Part 2 focuses on planning and scheduling in manufacturing and consists of five chapters: (i) project scheduling (i.e. a single project consisting of a number of separate jobs with precedence and workforce constraints); (ii) single machine, parallel machine and job shop models (where classical scheduling problems are considered referring to objective functions like makespan); (iii) flexible assembly systems (where there are similarities with the job shop model, but also different constraints like material handling service availability and syncronisation of operations); (iv) lot sizing and scheduling (i.e. scheduling of different types of jobs with a number of identical jobs for each type); (v) planning and scheduling in supply chains (i.e. scheduling of a manufacturing environment consisting of a network of raw materials and part providers, production facilities, distribution centres and customers).
- Part 3 focuses on planning and scheduling in services and consists of four chapters: (i) reservation systems and time tabling models (in reservation models, jobs are represented by reservations that are to be selected for processing, while in time tabling, jobs are subject to constraints like availability of operators and tools); (ii) scheduling and time tabling in sports and entertainment (i.e. scheduling of tournaments like games assigned to a team that alternates between games at home and games away, subject to a number of constraints and preferences); (iii) planning, scheduling and time tabling in transportation (i.e. assign different trips within given time windows to aeroplanes, trains, oil tankers and so on); (iv) workforce scheduling (i.e. shift scheduling and crew scheduling).
- Part 4 concerns systems development and implementation issues and consists of three chapters: (i) design, development and implementation of planning and scheduling systems (system architectures, types of databases, planning and scheduling engines, user interfaces); (ii) advanced concepts in system design (robustness, learning mechanisms, reconfigurability, Internet related features); (iii) future directions in the research and development of planning and scheduling.

Six appendices complete the book (mathematical programming formulations, exact optimisation methods, heuristic techniques, constraint programming, overview of selected scheduling systems, user's guide to the LEKIN job shop scheduling system).

In the reviewer's opinion, this book from Pinedo is a very well balanced and organised selection of contents in the planning and scheduling area. Also very interesting is the relationships and commonalities/differences that the book discusses between manufacturing and services applications.

The book may be very useful as an application guideline for practitioners from the manufacturing and services sectors, while it has a special value for academic people. In fact, the clear organisation of the book and the enclosed CD with slides of various teachers who have already adopted the book as a reference for their course, are quite important elements for considering the book as teaching aid. It seems that the book may be intended for a senior level or master level course in engineering or business schools.

Marco Garetti
Politecnico di Milano
Dipartimento di Ingegneria Gestionale