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Foreword

Graph theoretical models have in many circumstances provided an efficient tool for tackling a class of scheduling problems often denoted by *chromatic scheduling*.

It consists basically in the assignment of items to some periods of time while taking into account a collection of constraints. A well-known example of such a problem is the school timetabling problem where lectures have to be scheduled in the week subject to usual requirements (capacity of classrooms, availabilities of teachers, special teaching equipments, etc.).

Sports scheduling may also fit in this framework when competitions between the teams of a league have to be arranged in the season (time and location have to be determined).

The variety of requirements which usually occur in real life problems is such that the simple coloring models have to be extended and combined with other optimization techniques. Combinatorial programming models are therefore widely used and in some instances artificial intelligence techniques seem to be an essential component of decision support systems in the area of chromatic scheduling.

In this special issue a few contributions to various aspects of scheduling and timetabling will illustrate some recent research areas.

Timetabling is one of the main topics of this issue. Several models are presented for constructing school or university course schedules; some are based on node coloring in graphs. Extensions are introduced for handling the case where there is a partial order on the different topics of the lectures.

The famous Tabu search technique is applied to a course scheduling problem and it produces solutions which are better and obtained faster than with other known heuristics.

A formulation in terms of 0-1 programming is developed for a timetabling problem and a solution procedure based on exchanges is described. Experiments show that it can be combined efficiently with lagrangean relaxation.

Since the objectives in a timetabling problem cannot always be formulated quantitatively in an objective function, interactive approaches are sometimes preferred. Such a procedure is discussed with an application to a real situation.

Artificial intelligence and more precisely logic programming techniques are proposed for constructing a university timetable and practical experiences on microcomputers seem to produce very convincing results.

Two papers in this issue are concerned with sports applications; one consists in the construction of a schedule for a professional football league while the other

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studies strategies for choosing players in a sequence of matches between two players chosen in two given sets of opponent players. A model based on probabilities is developed.

A special case of coloring is often an appropriate model for some types of timetabling problems: it consists of edge coloring in a multigraph. Properties of edge colorings in complete bipartite graphs are studied in an article while another one discusses the completion of a partial edge coloring (a partially constructed timetable) into an optimal one. Another paper proposes a matching algorithm for regular bipartite graphs.

An edge coloring model adapted to open shop scheduling with a resource is also presented.

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