ISSN 0005-1179, Automation and Remote Control, 2010, Vol. 71, No. 10, pp. 2019–2020. © Pleiades Publishing, Ltd., 2010.
Original Russian Text © F. Werner, A. Lazarev, 2010, published in Avtomatika i Telemekhanika, 2010, No. 10, pp. 3–5.

TOPICAL ISSUE

Foreword to the Thematical Issue Devoted to the Seventieth Anniversary of Academician V.S. Tanaev

DOI: 10.1134/S0005117910100012

This is a thematical issue of "Automation and Remote Control" devoted to the seventieth anniversary of Academician Vyacheslav Sergeevich Tanaev, an outstanding researcher in the development of the theory and methods of optimization and their application to the design of computer-aided systems of design, planning, and control.

The scheduling theory is a section of the discrete mathematics considering the mathematical formulations and the methods of solutions of the problems of optimal satisfaction of some set of demands (jobs, tasks, processes and so on). The scheduling theory covers the issues concerned with construction of the optimal schedules (time schedules, graphs) of executing the finite or periodic complexes of operations in the limited-resource systems. The domain of application of the scheduling theory includes control of production, transport, construction, computer systems, and so on.

This line of scientific research dates back to the work of Henry Gantt [1] who proposed in 1903 a method of graphic representation of schedules which are called today the Gantt diagrams. The term "scheduling theory" was suggested in 1956 by the renowned mathematician R. Bellman [2].

Active theoretical studies of the problems of the scheduling theory began since the 1950s. The works of S.M. Johnson [3], J.R. Jackson [4], and W.E. Smith [5], as well as the monograph of R.W. Conway, W.L. Maxwell, and L.W. Miller [6] deserve special mentioning.

The present issue contains papers presenting the results of studies of the problems of scheduling theory, time schedules, and allied areas of the discrete optimization that were written both by the disciples of V.S. Tanaev and other colleagues working in this field.

The spectrum of studies of the Tanaev's team was sufficiently wide and encompassed the main models and problems of optimization arising at various purposeful activity. The issue contains works reflecting the main sections of the studies originated in the Soviet Union in the works of V.S. Tanaev [7–10].

The papers are classified with the following sections of the discrete mathematics and operations research:

- Problems of the scheduling theory for single machine (5 papers).
- Multi-machine and multi-stage problems of the scheduling theory (3 papers).
- Logistic problems (3 papers).
- Parallel and distributed systems (1 paper).

The single-machine problems are represented by numerous publications considering NP-hard problems and those for which it is not known whether they are NP-hard or polynomially solvable.

Many papers of this issue consider the development of algorithms for precise and approximate solution of the multi-machine and multi-stage problems of the scheduling theory.

The results and approaches obtained for the problems of the scheduling theory are often used to construct efficient algorithms to solve practical problems. The present issue contains papers devoted to the practical problems such as production planning, generation of the backlog of orders, transport logistics, and parallelization of computations.

We hope that the proposed thematical issue will be of interest to a wide range of researchers in the area of the scheduling theory and allied sections of mathematics and technology.

Although V.S. Tanaev died unexpectedly in 2002 at the age of 63, the research topics and philosophy founded by him remain the guidelines for the international scientific teams. May the memory of our colleague and teacher be blessed.

REFERENCES

1. Gantt, H.L., *ASME Transactions*, 1903, vol. 24, pp. 1322–1336.
2. Bellman, R., Mathematical Aspects of Scheduling Theory, *J. Soc. Indust. Appl. Math.*, 1956, vol. 4, pp. 168–205.
3. Johnson, S.M., Optimal Two- and Three-stage Production Schedules with Setup Times Included, *Naval Res. Logist. Quarterly*, 1954, vol. 1, pp. 61–68.
4. Jackson, J.R., Scheduling a Production Line to Minimize Maximum Tardiness, *Manage. Sci. Res. Project*, Research Report no. 43, Los Angeles: Univ. of California, 1955.
5. Smith, W.E., Various Optimizers for Single Stage Production, *Naval Res. Logist. Quarterly*, 1956, vol. 3, pp. 59–66.
6. Conway, R.W., Maxwell, W.L., and Miller, L.W., *Theory of Scheduling*, Reading: Addison-Wesley, 1967. Translated under the title *Teoriya raspisanii*, Moscow: Nauka, 1975.
7. Tanaev, V.S. and Shkurba, V.V., *Vvedenie v teoriyu raspisanii* (Introduction to the Scheduling Theory), Moscow: Nauka, 1975.
8. Tanaev, V.S., Gordon, B.C., and Shafransky, Ya.M., *Teoriya raspisanii. Odnostadiinye sistemy* (Scheduling Theory. Single-stage Systems), Moscow: Nauka, 1984.
9. Tanaev, V.S., Sotskov, Yu.N., and Strusevich, V.A., *Teoriya raspisanii. Mnogostadiinye sistemy* (Scheduling Theory. Multi-stage Systems), Moscow: Nauka, 1989.
10. Tanaev, V.S., Kovalyov, M.Ya, and Shafransky, Ya.M., *Teoriya raspisanii. Gruppovye tekhnologii* (Scheduling Theory, Group Technologies), Minsk: Inst. Tech. Cybernetics, Belarus NAN, 1998.

F. Werner and A. Lazarev