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Knihy došlé do redakce (Books received)

Automata, Languages and Programming. 14th International Colloquium, Karlsruhe, Federal Republic of Germany, July 13—17, 1987, Proceedings (*Thomas Ottmann, ed.*). (Lecture Notes in Computer Science 267.) Springer - Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. X + 565 pages; DM 72,—.

Computation Theory and Logic (*Egon Börgner, ed.*). (Lecture Notes in Computer Science 270.) Springer - Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. IX + + 442 pages; DM 60,50.

Peter Schnupp, Chai Thuy Nguyen Huu: Expertensystem - Praktikum. (Springer Compass.) Springer - Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. X + 360 Seiten; 102 Abbildungen; DM 88,—.

Concurrency and Nets — Advances in Petri Nets (*K. Voss, J. J. Genrich, G. Rozenberg, eds.*). Springer - Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. X + 622 pages; DM 94,—.

Clarence A. Ellis, Nalah Naffah: Design of Office Information Systems. (Surveys in Computer Science.) Springer - Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. VII + 248 pages; 36 figs.; DM 59,—.

Herbert Edelsbrunner: Algorithms in Combinatorial Geometry. (EATS Monographs on Theoretical Computer Science 10.) Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. XV + 423 pages; DM 98,—.

Armand M. de Callataÿ: Natural and Artificial Intelligence — Processor Systems Compared to the Human Brain. North-Holland, Amsterdam 1986. 500 pages; Dfl. 185,—.

Dominique Snyers, André Thayse: From Logic Design to Logic Programming — Theorem Proving Techniques and P-Functions. (Lecture Notes in Computer Science 271.) Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. 125 pages; DM 27,—.

Future Parallel Computers. An Advanced Course, Pisa, Italy, June 9—20, 1986, Proceedings (*P. Treleaven, M. Vanneschi, eds.*). (Lecture Notes in Computer Science 272.) Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. V + 492 pages; DM 60,50.

Functional Programming Languages and Computer Architecture. Portland, Oregon, USA, September 14—16, 1987, Proceedings (*Gilles Kahn, ed.*). (Lecture Notes in Computer Science 274.) Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. VI + 470 pages; DM 60,50.

James S. Royer: A Connotational Theory of Program Structure. (Lecture Notes in Computer Science 273.) Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987. V + 186 pages; DM 31,50.

Petr Brož, Petr Procházka: Metoda okrajových prvků v inženýrské praxi. (Teoretická knižnice inženýra.) SNTL — Nakladatelství technické literatury, Praha 1987. 192 stran; 57 obr., 5 tab.; Kčs 30,—.

V. I. Gricenko, A. A. Pančenko, A. P. Lapa: Problemno-orientirovannoe modělirovanie proizvodstvenno-transportnych sistěm. Naukova dumka, Kiev 1987. 160 stran; Rbl. 1,60.

K. P. JANTKE, Ed.

Analogical and Inductive Inference

International Workshop AII '86, Wendisch-Rietz, GDR, October 6—10, 1986, Proceedings

Lecture Notes in Computer Science 265.
Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987.
VI + 227 pages; DM 36,—.

Since their very origins, theory and practice of algorithms, and effective computational processes in general, have focused their attention and effort to the problems of deductive nature — how to compute, as easily as possible, the value taken by a given function for a given argument value inside the definition domain of this function. The problem how to obtain, which computable function corresponds to the observed or measured phenomena and data, and to their mutual dependences or relations, it has been taken as an exclusive matter of human creative intellectual effort. Nevertheless, the growth of artificial intelligence methods and their pretentions to simulate and replace human's behaviour even in the most sophisticated creative tasks, has shifted the limits in such a way, that an automated development and proposition of formal theories and recursive functions on the ground of empirical data, has become an integral part of artificial intelligence and computer science. As far as the reviewer knows, one of the first special meetings dedicated to this area of applied mathematics was the workshop held in Wendisch-Rietz, as introduced above, the proceeding of which we are to review.

The volume contains sixteen papers, including the invited one by R. P. Daley, all of them dealing with the fundamental problem: how to describe the notions of analogy and natural induction within an appropriate formalized framework, and how to use these notions when proposing appropriate inference algorithms. The already mentioned invited key note offers rather general philosophical, methodological and even psychological considerations concerning a theory of learning general enough to cover the analogical and inductive inference as understood in this context. V. Bauche describes a hierarchy of analogical reasoning used in various systems when generating plans for robot's activity. The paper by W. I. Gasarch and C. H. Smith proposes a way how to generate a sequence of functions to approximate an incompletely known one. Two authors from Hungary, T. Gergely and Z. Szabó, use the fixed points of appropriate equations to propose hypothesis concerning dependences among observed properties of some elements. The problem connected with identifications of computable functions, the observations of which are falsified by a noise, are investigated by J. Grabowski. M. Haraguchi and S. Arikawa propose a relational structure over formal models of formalized theories with the aim to define analogy as a partial identity of such models. A way how to take profit, at least partially, from missing items in data vectors concerning observed elements, is proposed by A. Juhos (the same problem has been already posed and solved by the so called GUHA-method with x-values; a more detailed confrontation should be interesting and desirable). S. Lange investigates the decidability problem of Church-Rosser specifications in order to show the limits within which these specifications can be used in automated program synthesis. Rather vague philosophical considerations concerning the relations between semantics and analogy in the framework of category theory and graph theory is presented by D. Pötschke. An informally written paper by J. Selbig deals with possible applications of knowledge acquisition by inductive learning from examples in expert systems. C. H. Smith and M. Velauthapillai describe and discuss several theoretical models to infer programs approximately (in a sense) computing the desired function. A stratified inductive hypothesis generation is dealt by Z. Szabó, one more model-theoretic approach to analogy presents H. Thiele. R. Wiehagen offers some results concerning the computational complexity of program synthesis of recursive functions from examples. Finally, T. Zeugmann discusses a Barzdin's conjecture ("if for each effective operator O, which maps a class U of recursive functions into recursive functions, the image class $O(U)$ of U can be identified in the limit, then U is recursively enumerable"), gives its alternative formulations and proves its importance for the theory of inductive inference.

Up to three or four papers explicitly mentioned above, which are rather of conceptual and informal nature, all other contributions are conceived as purely mathematical studies written at a high level of preciseness and mathematical culture. The average extent of particular texts is significantly greater than it is common in proceedings like these one, and this fact should be appreciated, as it enables to present proofs, discussions, comments, etc. in more details. Worth mentioning is the complete lack of probabilistic models and approaches; it is difficult to say whether it is caused by the very state of the domain in question in our days, by some preferences taken by the organizers, or for other reasons. The volume conserves the traditional cover and traditionally high level of the Lecture Notes series.

Ivan Kramosil

ARMAND M. DE CALLATAŸ

Natural and Artificial Intelligence

Processor Systems Compared to the Human Brain

North-Holland, Amsterdam 1986.
500 pages; Dfl. 185,—.

The book represents an original treatment of confrontation of computers and brain with the aim both to enhance understanding of nervous system and to delvelop computer hardware and software architectures able to cope more efficiently with problem solving tasks. In an Introduction (100 pages) and 5 chapters (Hardware—Software—Robotics—Nervous System—Brain Model), the reader is exposed to the 'my model' of the author, which incorporates and discusses many methods, techniques and theories from the area of computer science, artificial intelligence, neurophysiology, psychology and others. The model tries to be as close as possible to the real brain, including quantitative assessments; not proven hypothesis are frankly discussed, some of potential objectives answered. The model is theoretical, specified by general outlines and properties rather than implementation details; many of its subsystems have however allegedly been simulated.

Among the main features of the model, there are: connectionist hardware, content addressable memories, analog and symbolic computation, directed network processor systems including nonadaptive all-or-none memories, perceptrons and finite automata, rhytmic processing, self-learning, behavior rules (state and intention produce action), Piaget's theory, neuroanatomical correlates of various model functions. Besides and within the discussion of the model, the book conveys in a more or less detailed and convicing way many facts, approaches and views from related disciplines, like parallel computer architectures, nonimperative programming (with particular emphasis on Prolog), theory of learning, brain anatomy and many others. However, it is not a traditional introduction to any of these topics; rather it may be used as an encyclopedia, in which items are explained in a nonspecific interdisciplinary language.

The style of presentation is far from being concise and exact. The reader will find a set of highly repetitious, unsystematically ordered brief paragraphs; on the other hand, wherever he opens the book, he will probably find an interesting note, comparison, conjecture. If patient enough, he will be rewarded by valuable facts, insigths and inspirations. An extensive bibliography (442 items) provides a tool for further study; it seems to cover most of the pertinent current research, except the theory by Grossberg, Hopfield and others, which meanwhile led to first commercially available neurocomputers. In the reference to a 1983 survey (p. 32), the pointer to item [180] of bibliography is missing.

Let us conclude this review with a statement from the conclusion of the book: 'the more one studies natural intelligence, the more one gets impressed by its superiority over present AI methods'. The book gives and explains reasons for the believe as well as hints how to utilize it; however disputable the presentation might be, it is worth to see it.

Jiří Hořejš

EIITI WADA, Ed.

Logic Programming '86

Proceedings of the 5th Conference, Tokyo, Japan, June 23—26, 1986

Lecture Notes in Computer Science 264.
Springer-Verlag, Berlin—Heidelberg—New York—London—Paris—Tokyo 1987.
VI + 179 pages; DM 31,50.

It is well known that logic programming becomes a rapidly growing area of computer science since Japanese selected Prolog to be a core language of the fifth generation computing devices. The volume of Springer Lecture Notes under review is devoted to this interesting area. It includes papers presented at the fifth Logic Programming Conference held in Tokyo in June 1986, sponsored by the well-known Institute for New Generation Computing Technology (ICOT).

The table of contents shows a varied scale of papers that concern logic programming from different respects. Nearly fifty authors took part in sixteen contributions. Papers dealing with theoretical foundations of logic programming as well as application of logic programs are included. It is difficult to sort the papers into some rigorously defined fields, some of them touch several problems.

Let us start with papers devoted to theoretical foundations. Haraguchi and Arikawa's paper presents an attempt to establish a formal definition of reasoning by analogy in terms of logic programming. A notion of analogical union of logic programs is introduced and then it is used to give general framework for reasoning process treated as a deduction from the analogical union.

"Programming in Modal Logic: An Extension of PROLOG Based on Modal Logic" that is the title of Sakakibara's contribution. It is well readable paper presenting a procedural interpretation of modal logic. The purpose is to enrich first-order predicate logic with modalities such as necessity and possibility together with their possible-world semantics. Sakakibara's approach is based on one possible-world model which is understood as a program. Modal expressions are then interpreted in that model. That differs from other approaches in which a program is understood as a set of axioms, and theorems derived from these axioms are understood as answers. The presented approach is compared with various modal extensions of Prolog like MOLOG, Prolog/KR, and metaProlog described by various authors elsewhere earlier.

The paper written by T. Shintani et al. is devoted to knowledge oriented reasoning environment (KORE) which facilitates designing and developing intelligent decision support systems. It is a hybrid system involving object-oriented, data-oriented, rule-based, network-oriented and, logic oriented programming techniques. All these subsystems are integrated via relational tables on Prolog, which are used as a common internal representation of the above mentioned subsystems.

Some of the papers deal with object oriented programming languages like the paper on the language SPOOL by S. Yokoi. It leads us into another group of papers dealing with compilers. It is known that earlier implementations of Prolog were interpreters while now many people pay attention to construction of efficient compilers. H. Komatsu et al. discuss their experiments with optimization of Prolog compiler to reach high efficiency and portability. They gained more than 1 mega lips on IBM 3090 machine.

Last but not least group of papers concerns parallel programming methodology. H. Koike and H. Tanaka describe a fast execution mechanism of parallel inference engine, called PIE, based on pipelined goal rewritting. Since the goal rewriting model makes goals completely independent it reduces access conflict. The system represents a highly parallel inference based on OR-parallel processing.

The paper by M. Nilsson and H. Tanaka on FLENG Prolog is very interesting. The authors suggest a general purpose logic programming language for arbitrary parallel architectures but especially efficient to run on vector architectures. Relations to GHC (Guarded Horn Clauses), Kernel Parlog and Concurrent Prolog are discussed.

Some of the papers collect experience with knowledge engineering problems like in the paper on LES-2, a legal expert system, or problem of interface with a database system applied in navigation (M. Takizawa et al.) and, eventually, text generation in a help system described by T. Kakiuchi et al.

In spite of the fact that we didn't mention all papers in detail we believe that even this short information indicates abundance of current trends in logic programming. The conference in Tokyo undoubtedly showed that both theoretical investigation in logic programming methodology and its applications in knowledge engineering are lively discussed in computer science with the goal of more intelligent computing systems.

Petr Jirků

P. DEUFLHARD, B. ENGQUIST, Eds.

Large Scale Scientific Computing

Progress in Scientific Computing 7.
Birkhäuser Verlag, Boston—Basel—Stuttgart 1987.
xii + 288 pages; SFR 58,00.

This comprehensive volume of 22 papers surveying the present state of international research in large scale scientific computing touches at one side mathematical modelling and simulation in the various fields applications and at the second side computer sciences. It focuses especially on the study of initial and boundary value problems for linear and nonlinear partial differential equation of elliptic, parabolic and hyperbolic types as well as ordinary differential equations and related problems in mathematical physics, biology, chemistry, geophysics as well as inverse problems and optimal control problems and finally algorithm adaptation on supercomputers.

The book is the proceeding of the conference on "Large Scale Scientific Computing" organised by the Oberwolfach Mathematical Institute, on July 14—19, 1985, under the auspices of the Sonderforschungsbereich 123 of the University of Heidelberg. Concrete fields of applications included: semi-conductor design, chemical combustion, flow through porous media, climathology, seismology, fluid dynamics, tomography, rheology, hydro power plant optimization, subway control, space technology.

The editors has grouped the papers loosely into the following 6 sections: I. Initial value problem for ODE's and parabolic PDE's. II. Boundary value problems for ODE's and elliptic PDE's. III. Hyperbolic PDE's. IV. Inverse problems. V. Optimization and optimal control problems. VI. Algorithm adaptation on supercomputers. For all sections, nonlinearity plays a dominant role.

The papers of the first part of this collection are devoted to initial value problems for ODE's and initial boundary value problems for parabolic PDE's. The paper of Bank et al. deals with computational techniques for semi-conductor device modelling with application in chip fabrication. The Yserentant's paper concerns the use of hierarchical bases in finite element computations of parabolic problems. It is shown that the linear systems arising at each time step can be solved at least as efficiently as in the elliptic case provided that the multi-level splitting of the finite element space is stopped on a certain level depending on the stepsize in time. In the third paper (Deuflhard, Nowak) highly sophisticated extrapolation techniques are described including order and stepsize control and index monitoring. The Warnatz's paper gives a general survey of the demands arising from computational combustion. The next paper (Fu, Chen) investigates the nonequilibrium ionization processes. The method represents an asymptotic expansion around the equilibrium points of the physical systems under consideration. In the last paper (Knabner) an algorithm for the numerical simulation of saturated-unsaturated flow through porous media, which mathematically leads to a mixed parabolic-elliptic free boundary value problem, is studied.

The second section covers boundary value problems for ODE's and elliptic PDE's. Deuflhard et al. applied the numerical pathfollowing technique to the case of BVP of ordinary differential equation. In the Jarausch's and Mackens' paper 2D-nonlinear elliptic PDE problems are studied. In Giovangigli's and Smooke's paper a special ordinary differential equation-partial differential equation version of the pseudo-arclength continuation method is discussed. In the Ascher's and Spudich's paper the theoretical seismograms are studied. The last paper of this section aims at 3D-Stokes problems. The algorithm consists of a combination of a boundary element method with multigrid procedure and of a spectral method.

The third section deals with hyperbolic equations. In Engquist's et al. paper general shock-capturing schemes of high order for the approximation of hyperbolic conservation law are derived. In the last paper (Rizzi) sophisticated 3D-computations for the incompressible and compressible Euler equations are presented using a finite volume method with 600 000 grid cells! (One such a computation runs in about 2 hours of CPU time on the CYBER 205 supercomputer!!).

The fourth section deals with inverse problems. The papers by Louis, Lewitt and Kruse, Natterer are devoted to the inverse Radon transform problem arising in computer tomography. The last paper of this section (Friedrich, Hofmann) advocates to regularize the inverse problem in connection with discretization of the PDE.

The fifth section surveys large scale optimization and optimal control problems. So Spielberg and Suhl describe the software for mixed integer-real optimization. A fast linear programming solver is combined with branch and bounded techniques. Krämer-Eis and Bock develop an algorithm for the computation of optimal feedback control laws, which allows as a unique feature the treatment of state control constraints including even non-connected control sets. Bauer et al. in their paper describe the Gosan power plant system. Mathematically one has to solve a problem of optimal control with a nonlinear nonconvex objective and a large number of constraints.

The last sixth section is devoted to algorithms applying to supercomputers. In the first paper of this section (Duff) the performance of sparselinear equation solvers on different suppercomputers (as the CRAY X-MP, the CRAY 2, the CONVEX C-1, the NEX-SX-2, the Fujitsu FACOM VP 100) is compared. The next paper (Gropp) presents a modification of adaptive gridding that was developed in view of supercomputers. The last paper (Hayes) describes several approaches to converting numerical algorithms in biomedical applications for use on supercomputers.

Contents I. section. Initial value problems for ODE's and parabolic PDE's

II. section. Boundary value problem for ODE's and elliptic PDE's

7. Deuflhard P., et al.: Numerical pathfollowing beyond critical points in ODE Models.
8. Jarausch H., W. Mackens: Computing bifurcation diagrams for large nonlinear variational problems.
9. Giovangigli V., M. D. Smooke: Extinction limits for premixed laminar flames in a stagnation point flow.
10. Ascher U., P. Spudich: A numerical method for calculating complete theoretical seismograms in vertically varying media.
11. Hebeker F. K.: On a new boundary element spectral method.

III. section. Hyperbolic PDE's

12. Engquist B. et al.: A high order non-oscillatory shock capturing method.
13. Rizzi A.: Vortex dynamics studied by large-scale solutions to the Euler equations.

IV. section. Inverse problems

14. Louis A. K., R. M. Lewitt: Numerical backprojection in the inverse 3D Radon transform.
15. Kruse H., F. Natterer: A direct algebraic algorithm in computerized tomography.
16. Friedrich V., B. Hofmann: A two-grid approach to identification and control problems for partial differential equations.

V. section. Optimization and optimal control problems

17. Spielberg K., U. H. Suhl: Solving large-scale integer optimization problems.
18. Krämer-Eis, P., H. G. Bock: Numerical treatment of state control constraints in the computation of feedback laws for nonlinear control problems.
19. Bauer W. et al.: Optimal production scheme for the Gosau hydro power plant system.

VI. section. Algorithm adaptation on supercomputers

20. Duff I. S.: The use of vector and parallel computers in the solution of large sparse linear equations.
21. Gropp W. D.: Local uniform mesh refinement on vector and parallel processors.
22. Hayes L. J.: Using supercomputer to model heat transfer in biomedical applications.

Jiří Nedoma

MARTIN MOSNÝ, MARGITA MOZOLÍKOVÁ

Modelovanie transformačných systémov

Veda — vydavateľstvo Slovenskej akadémie vied, Bratislava 1986.
Stran 304; cena 48,— Kčs.

V nakladatelství VEDA vyšla v r. 1986 kniha autorů Martina Mosného a Margity Mozolíkové „Modelovanie transformačných systémov". Práce má 300 stran. Kromě úvodu, čtyř kapitol a závěru obsahuje ještě seznam literatury o 103 položkách a krátká résumé v ruštině a angličtině. Graficky je publikace velmi pěkně upravena. Obsahuje hojnost obrázků.

Záměrem recenzované knihy je nabídnout čtenáři prostředky a postupy určené k jednoznačné reprezentaci poznatků. Vychází z mínění, že „v súčasnosti nie sú všeobecne známe symboly a pravidlá slúžiace na opis poznatkov o kvalitatívných stránkach skúmanej skutočnosti", a že tento nedostatek zpomaluje přechod k počítačovému zpracování jiných než kvantitativních úloh. Kniha nepředpokládá u čtenáře žádné znalosti logiky nebo matematiky, přesahující úroveň základní školy (podle nakladatelského sloupku na přebalu je určena mj. studentům středních škol).

První část, nazvaná „Prístupy k modelovému vyjadreniu a využívaniu poznatkov subjektu o ním skúmanej skutočnosti" obsahuje popisy a definice veškerého potřebného aparátu.

Prostředky a postupy, které kniha čtenáři nabízí, jsou prostředky a postupy matematicko-logického modelování, jak vzniklo v ČSSR v 50. letech z potřeb tehdy probíhajícího bouřlivého rozvoje hutnictví a strojírenství. Tato metoda, podle vyjádření autorů, odstraňuje do jisté míry nedostatky ostatních přístupů k problematice modelování (shrnuté na str. 17—21) a nachází užití ve všech oblastech, kde se něco poznává, organizuje, řídí, třídí, používá, renovuje, likviduje apod. (str. 22). Popis historického vývoje matematicko-logického modelování osvětluje některé méně známé skutečnosti a staví je do překvapujících souvislostí. Citujeme ze str. 22: ,,Z historického hľadiska sa najprv ako naúka alebo disciplína formovala logika (niekoľko stor. pred n. l.). O mnoho storočí po jej vzniku sa dospelo k matematickej logike; jej vznik sa datuje od 9. stor. n. l. Dotvára sa najmä v minulom a terajšom storočí. Až v našom storočí vzniká matematicko-logické modelovanie. V ČSSR vznikali prvé práce postupně od r. 1958."

Struktury, jež ,,matematicko-logické modelování" používá, jsou dvě: množina a strom. Množinový diagram, zjednodušený v tom smyslu, že je vyloučeno zakreslování podmnožin a přípustná je pouze jedna množina a v ní jednotlivé její prvky, se nazývá ,,bloková schéma matematicko-logického modelovania", přičemž mezery mezi jednotlivými prvky množiny se nazývají ,,kľúče matematicko-logického modelovania" (str. 31). Tento prostředek autoři nepokládají za ,,osobitně výkonný"; takový je teprve strom. Ten umožňuje nejen rozčlenit složitější útvar v jeho složky (,,argumenty"), nýbrž též u každého argumentu vyjmenovat hodnoty, jichž může nabýt. Pak lze jednoduchým výpočtem určit počet všech možných způsobů dosazení a současně je přehledně zakreslit. Podle způsobu nakreslení se strom nazývá buď ,,štruktúrna schéma matematicko-logického modelovania" nebo ,,mierka matematicko-logického modelovania" (str. 31—35). Alespoň dvě ,,mierky" pak tvoří ,,model matematicko-logického modelovania" (str. 36).

Ve zbylé části knihy je tento aparát rozpracován na několika příkladech. Druhá kapitola, nazvaná ,,Poznávanie objektívnej reality v súvislosti s modelovaním transformačných systémov" obsahuje návrh roztřídění základních vlastností objektivní reality. Je to jakási příprava pro stěžejní, třetí část knihy (str. 114—279), obsahující model všeobecného transformačního systému. Pod transformačním systémem autoři rozumějí zvolenou část neustále se měnícího hmotného světa, která je předmětem zkoumání (str. 59). Pod všeobecným transformačním systémem pak rozumějí soustavu znaků, jejímž prostřednictvím lze jednoznačně identifikovat všechny činitele transformačního systému, jejich vzájemné vztahy a změny (str. 115). Posoudit vhodnost či nevhodnost volby jednotlivých hledisek třídění a odpovídajících tříd přesahuje kompetenci recenzentů, jelikož se jedná v první řadě o problematiku výrobní a ekonomickou. Autoři například konstatují, že každý systém se dělí na složku organizační, kontrolní a výkonnou, přičemž každá z těchto složek má opět svou složku organizační, kontrolní a výkonnou (v tomto kroku se iterace zastavuje — důvody pro zvolený způsob třídění autoři bohužel nikde nepodávají). Podobně rozlišují např. stádium před transformací, během transformace a po transformaci. Postupnou komplikací těchto možností vzniká 32 stromů o celkovém počtu 2080 listů (koncových vrcholů, odpovídajících jednoznačnému označení určité kombinace hodnot), jejichž nákres je na str. 235—243. Tím je popsán příklad všeobecného transformačního systému. Stojí za zmínku, že jeho popis zabírá zhruba 123 stránky knihy. Na nich autoři hlavní myšlenku, postupnou komplikaci třídění všeobecného transformačního systému, opakují čtyřikrát. Nejprve na str. 119—172 v obšírnější verzi, z níž zvlášť podstatné pasáže jsou reprodukovány v třech dvacetistránkových verzích (172—191, 192—211 a 211—230) shodných až na výjimky doslovně.

Konečně poslední, čtvrtá část knihy se jmenuje ,,Aplikácie modelovania transformačných systémov". Čtenář, očekávající, že zde konečně najde důvod pro studium předcházejících dvou set osmdesáti stránek, bude zklamán. Kapitola má pouze čtyři stránky, rozdělené na osm oddílů. Z nich se doví jen to, co se rozumí pod pojmy modely elementárních, sdružených, komplexních a dalších transformačních systémů.

Ještě několik slov k formální straně publikace. Ve snaze o ,,vědecké" vyjádření označili autoři každý pojem, který hraje nějakou roli v jejich teorii, symbolem, tvořeným posloupností písmen a číslic. Dokud čteme neustále o objektívnej realitě OR, můžeme se tomu podivovat, ale v pochopení věty nám to nebrání. Ale většinou se tím text stává téměř nečitelným. Například jeden z bodů vlastního projektování transformačního systému zní takto: „Ohraničením, analýzou a syntézou orientovaných činností FRTCXIZS, ktorými sa odstránia rozdiely RTCXIZS transformácie TCXIZS medzi pracovnými predmetmi C1XS až CmXS a požadovanými produktmi I1ZS až InZS." (bod 7, str. 260). Také odkazy na literaturu jsou poněkud zašifrovány. Seznam literatury je sice průběžně číslován, ale autoři se neodvolávají na příslušné číslo přímo v textu, ale prostřednictvím poznámky pod čarou, která neobsahuje ani jednou víc než číslo, odkazující k seznamu literatury a případně stránkový údaj. Přitom číslo odkazu a číslo v seznamu literatury jsou v záhadném, nicméně vzájemně jednoznačnému vztahu. Důsledkem toho je, že např. na str. 53 narazí čtenář na odkaz „45". Dosud však našel pod čarou pouze poznámky 1—36, takže musí hledat směrem vpřed, protože na stránce samé žádná poznámka pod čarou není. Najde ji až na straně 285 a její obsah je „89".

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