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The strong impact of the J. A. Robinson's resolution strategy was reflected by a great number of the papers concerning resolution with some aspects. Since the straightforward application of resolution generates too many clauses, three important problems naturally arose: developing strategies for inference rules, more powerful inference rules and more effective ways of representing problems. As inference rules are discussed Pi-resolution and hyper-resolution, introduced by J. A. Robinson, and paramodulation, introduced by L. Wos and G. Robinson. Four classes of automated theorem-proving strategies are identified: Guiding strategies (unit preference, introduced by L. Wos, G. Robinson, D. Carson; selection strategies, used by R. Kowalsky and J. Slagle; R. Overbeek's weighting), Restriction strategies (set-of-support strategy, introduced by L. Wos, G. Robinson, D. Carson; unit restriction, by the same authors; linear resolution of D. Loveland and D. Luckham), Simplification strategies (demodulation of L. Wos, G. Robinson, D. Carson, L. Shalla) and Pruning strategies (subsumption, proposed by J. A. Robinson). Another interesting topic discussed in many papers in the period was the problem of completeness (and other logical properties) for the strategies developed, since this property assures, theoretically, at least one proof for each theorem. Concerning testing, implementation and experiments with the theorem proving programs, the quite important idea is that the various computer programs contributed very much more than a means of idea testing; through their use important additions to the theory were found. Along with the "logical" (logic based) approach to the automation of reasoning was the "human" approach, attempting to study and simulate human reasoning. Around 1970 this trend received more and more attention, the most important areas being question-answering (C. Green's contributions) and the application of theorem proving to program verification. The features of the seventies are discussed and their conclusions are outlined.

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The second volume contains the following papers: R. W. Binkley and R. L. Clark: "A cancellation algorithm for elementary logic" (pp. 27-47) [Theoria 33, 79-97 (1967)];


J. R. Slagle: "Automated theorem proving with renamable and semantic resolution" (pp. 55-65) [J. Assoc. Comput. Mach. 14, 687-697 (1967; Zbl 0157.024)];

L. T. Wos, G. A. Robinson, D. F. Carson and L. Shalla: "The concept of demodulation in theorem proving" (pp. 66-84) [ibid. 14, 698-709 (1967; Zbl 0157.024)];

P. B. Andrews: "Resolution with merging" (pp. 85-101) [ibid. 15, 367-381 (1968; Zbl 0182.025)]:

Siekmann, Jörg (ed.): Wrightson, Graham (ed.)


Automation of reasoning. 2: Classical papers on computational logic 1967- 1970. (English) Zbl 0567.03002

P. B. Andrews: "On simplifying the matrix of a wff" (pp. 102-116) [J. Symb. Logic 33, 180-192 (1968; Zbl 0157.335)];


J. A. Robinson: "The generalized resolution principle" (pp. 135-151) [Machine Intelligence 3, 77-93 (1968; Zbl 0195.311)];


N. G. de Bruijn: "AUTOMATH, a language for mathematics" (pp. 159-200) [TH Report 68-WSK-05, Techn. Univ. Eindhoven (1968)];


D. W. Loveland: "Theorem-provers combining model elimination and resolution" (pp. 249-263) [Machine Intelligence 4, 73-86 (1969; Zbl 0257.68083)];


D. Prawitz: "Advances and problems in mechanical proof procedures" (pp. 283-297) [Machine Intelligence 4, 59-71 (1969; Zbl 0257.68082)];

G. Robinson and L. Wos: "Paramodulation and theorem-proving in first-order theories with equality" (pp. 298-313) [ibid. 4, 135-150 (1969; Zbl 0219.68047)];


C. L. Chang: "The unit proof and the input proof in theorem proving" (pp. 331-341) [ibid. 17, 698-707 (1970; Zbl 0212.342)];


R. Kowalski: "The case for using equality axioms in automatic demonstration" (pp. 377-398) [Lect. Notes Math. 125, 112-127 (1970; Zbl 0226.68055)];

D. W. Loveland: "A linear format for resolution" (pp. 399-416) [ibid. 125, 147-162 (1970; Zbl 0202.015)];


D. Luckham: "Refinement theorems in resolution theory" (pp. 435-465) [Lect. Notes Math. 125, 163-190 (1970; Zbl 0216.241)];


P. B. Andrews: "Resolution in type theory" (pp. 487-507) [J. Symb. Logic. 36, 414-432 (1971; Zbl 0231.03038)];

W. W. Bledsoe: "Splitting and reduction heuristics in automatic theorem proving" (pp. 508-530) [Artif. Intell. 2, 55-77 (1971; Zbl 0221.68052)];

R. Kowalski and D. Kuehner: "Linear resolution with selection function" (pp. 542-577) [Artif. Intell. 2, 227-260 (1971; Zbl 0234.68037)];


Reviewer: N. Curteanu

MSC:

03-06 Proceedings, conferences, collections, etc. pertaining to mathematical logic and foundations
68-06 Proceedings, conferences, collections, etc. pertaining to computer science
03B35 Mechanization of proofs and logical operations
68T15 Theorem proving (deduction, resolution, etc.) (MSC2010)
01A75 Collected or selected works; reprints or translations of classics

Keywords:
automated theorem proving; automation of reasoning