logic and propositional axiomatizations, OTTER has found publishable results. But for most mathematical problems of medium difficulty (such as the quadratic formula), OTTER and all other theorem provers usually wander astray in a combinatorial explosion of irrelevancies no matter how the flags and parameter are set.

The book's completeness (no prerequisites are needed) and many exercises make it suitable for use as a text on theorem proving. But theorem proving is usually part of an AI course that gives equal time to logic programming, neural nets, and genetic algorithms. At 551 pages and $88, it is too big and expensive for a supplemental reading text.

This book has extensive coverage of the logical foundation of theorem proving but usually without proofs. Kalman does not prove J. A. Robinson's theorem that most general unifiers always exist but he shows how they are generated, why symbol clashes or occurs checks imply non-unifiability, and how to get OTTER to print out most general unifiers. He states but does not prove the many refutational completeness proofs involving resolution, paramodulation, and set of support. The Knuth–Bendix completion procedure is well presented but without the usual theorems about critical pairs, confluence, and termination. Of the texts that cover resolution-based theorem proving with formal proofs, Chang and Lee's ***Symbolic logic and mechanical theorem proving*** (Academic Press, 1973) is the classic. Alexander Leitsch's ***The resolution calculus*** (Springer, 1997) has the most recent references.

What proofs there are are done precisely and in full detail—Kleene style. But the mathematics is not elegant. This can be blamed as much on the subject as the author. Automated reasoning does not have the depth, maturity, and beauty of complexity theory. Wos was one of the first to realize that it is primarily an experimental science. Progress depends as much on writing programs to determine what works as on writing papers on what might work. Workers in the field are more impressed with results (such as McCune's solution of Robbins's problem) than with theoretical arguments.

There are almost no errors. "6," "7," "8" should be "f," "g," "h" on pages 434–435. On page 510 "max-weight" should be "max_weight." The other errors (pages 116, 363, 377) are harmless.

The index is incomplete. It has "paramodulation" but neither "resolution" nor "binary resolution." It has "substitution" but not "replacement." On page 82 Kalman abbreviates "inferred-clause-processing procedure" to "icpp." This will cause problems for a non-linear reader who encounters this un-indexed abbreviation later in the book. The reason for complaining is that while most readers will be advanced OTTER users, the book is far too verbose to be read in its entirety by anyone except beginners.

If you need a user's guide to OTTER that goes beyond McCune's sixty-page reference manual, this is your only choice.

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MELVIN FITTING and RICHARD L. MENDELSOHN. ***First-order modal logic.*** Synthese library, vol. 277. Kluwer Academic Publishers, Dordrecht, Boston, and London, 1998, xii + 287 pp.

This is one of the few recent texts, if not the only one, devoted to modal predicate logic. The text contains two treatments of the logic, side by side. There is a detailed formal treatment, and a detailed philosophical treatment of the features and alternatives generated by the formal logic. The text is pitched at upper-level undergraduates or honours students.

The text contains an introductory treatment of the normal modal propositional logics, and then a most detailed formal treatment of the normal modal predicate logics with identity, and then *extends* the predicate logic with predicate abstraction. The favoured proof method is semantic tableau. The text emphasises possible-worlds relational semantics. This emphasis