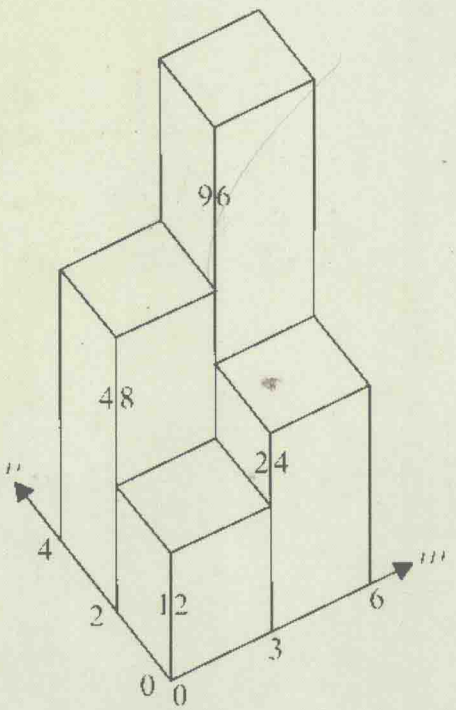
Zhou Xunwei

MUTUALLY-INVERSISTIC LOGIC, MATHEMATICS, AND THEIR APPLICATIONS



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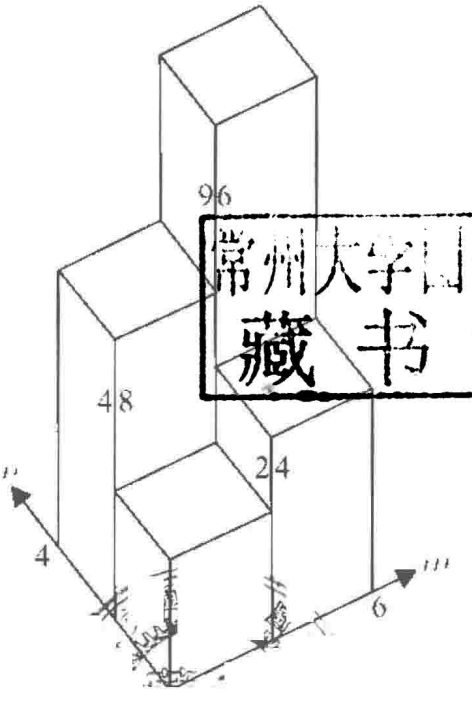

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Preface

In 1984, when I taught myself discrete mathematics, I found out that the definition of material implication is both valuable and defective. Its value lies in that it correctly reflects the establishment of implicational propositions. Its defect lies in that it cannot be used to make hypothetical inference, but its generalized inverse functions can make. Just like that when we know the summand 2 and the sum 5 and we want to find the addend, we cannot use addition 2+?=5 but its inverse operation subtraction 5−2=? to find it.

Since then, I have been constructing mutually-inversistic mathematical logic. Now, it is fully fledged. It includes mutually-inversistic logic, mutually-inversistic mathematics, and their applications. Mutually-inversistic logic includes two calculi and four theories of mutual-inversism, mutually-inversistic granular computing, unified logics. Mutually-inversistic mathematics includes mutually-inversistic analytic geometry, mutually-inversistic mathematical analysis, mutually-inversistic abstract algebra, universal matrix. Applications include logic programming (see Part 4), automated theorem proving, planning and scheduling, database, semantic network, expert system, program verification, natural language processing, hardware verification, machine learning, data mining, data warehouse, program refinement, many-valued computer, modern control theory, etc..

All branches of mutually-inversistic mathematical logic are discrete, so, mutually-inversistic mathematical logic can also be regarded as mutually-inversistic discrete mathematics.

This monograph is suitable for faculty members, researchers, graduate students working in the field of logic, mathematics, computer science, automation to use.

My email is zhouxunwei@263.net.

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Part 1
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Mutually-inversistic logical calculus is composed of mutually-inversistic propositional calculus and predicate calculus. As predicate calculus is more useful than propositional calculus, the author introduces predicate calculus first and in detail, introduces propositional calculus second and in brief.