

Preface

TSUTOMU SASAO – KYUSHU INSTITUTE OF TECHNOLOGY, JAPAN

The material covered in this book is quite unique especially for people who are reading English, since such material is quite hard to find in the U.S. literature. German and Russian people have independently developed their theories, but such work is not well known in the U.S. societies. On the other hand, the theories developed in the U.S. are not conveyed to the other places. Thus, the same theory is re-invented or re-discovered in various places. For example, the switching theory was developed independently in the U.S., Europe, and Japan, almost at the same time [4, 18, 19]. Thus, the same notions are represented by different terminologies. For example, the *Shegalkin polynomial* is often called *complement-free ring-sum*, *Reed-Muller expression* [10], or *Positive Polarity Reed-Muller expression* [19]. Anyway, it is quite desirable that such a unique book like this is written in English, and many people can read it without any difficulties.

The authors have developed a logic system called **XBOOLE**. It performs logical operations on the given functions. With XBOOLE, the readers can solve the problems given in the book. Many examples and complete solutions to the problems are shown, so the readers can study at home. I believe that the book containing many exercises and their solutions [9] is quite useful not only for the students, but also the professors.

Here, I would like to show a list of key books [6, 11–15, 17], some of them are already out of print. Especially, [15] shows the logic design system developed in IBM in early 1960's. XBOOLE uses essentially the same logical structure as [7, 15]. However, you can find that this book is more focused on the solutions of Boolean equations [4], rather than the classical minimization of logical expressions.

Finally, I would like to mention that one of the authors, Prof. Dr. Bernd Steinbach, regularly organizes the **International Workshop on Boolean Problems**. This is a quite unique and important workshop to exchange the idea of the Eastern and Western people in Boolean problems. I hope he can continue this important project.

Logic Functions and Equations

Examples and Exercises

Steinbach, B.; Posthoff, C.

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