



METADATA

Title: Logic circuits

Other Titles: Numerical systems, Binary codes, IEEE-754 code, Boolean algebra, Minimization of logical functions, Logic gates, Discrete element gates, Operation circuits, Flip-flops (ff), Encoders, Decoders, Multiplexers, State Machines, Adaptive Circuits, Programmable Logic Devices, Registers, Memories

Language: Greek

ISBN: 978-960-603-228-8

Subject: NATURAL SCIENCES AND AGRICULTURAL SCIENCES, MATHEMATICS AND COMPUTER SCIENCE

Keywords: IEEE-754 / Boolean Algebra / Number Systems / Logic Gates / State Machines

Bibliographic Reference: Giannakopoulos, P. (2015). Logic circuits [Undergraduate textbook]. Kallipos, Open Academic Editions. <http://dx.doi.org/10.57713/kallipos-487>

Abstract

The aim of the book is to meet the needs of students in the logic circuits module. The numerical systems, the conversions between the various numerical systems, and their presentation in a form suitable for use by computer systems are studied. Applications are then given to both classical cases of arithmetic systems and to IEEE-754 floating-point representation. The main codes for representing numbers, as well as error-correcting codes, are mentioned. Combinational circuits using Boolean algebra, as well as topics relating to the analysis and synthesis of logic circuits using logic functions, and all ways of simplifying them. Sequential circuits in both synchronous and asynchronous applications. A large number of examples are given and these are studied both in the classical way and with state diagrams. Also, various adaptation

circuits are given, as well as circuits for conversions from analog to digital and vice versa. Reference is made to the state-of-the-art way of studying and designing logic systems through programmable logic devices, the way of studying and designing any logic function using PLA, PROM, PAL techniques. Also, reference is made to the way of evolution of logic circuits and the rapid pace of technology development in the field of micro and nano devices. Special emphasis is given to memories and the operation of the Arithmetic and Logic Unit (ALU). Classic everyday applications using digital circuits are included, as well as a set of multiple choice questions for better understanding and consolidation. Finally, the syllabus has been supplemented with the addition of the new uses in digital of CNTFETs and memristors.

