

Gray Meyer Analog Integrated Circuits Solutions

The 2nd Edition of Analog Integrated Circuit Design focuses on more coverage about several types of circuits that have increased in importance in the past decade. Furthermore, the text is enhanced with material on CMOS IC device modeling, updated processing layout and expanded coverage to reflect technical innovations. CMOS devices and circuits have more influence in this edition as well as a reduced amount of text on BiCMOS and bipolar information. New chapters include topics on frequency response of analog ICs and basic theory of feedback amplifiers.

Market_Desc: · Engineers· Managers· Technicians About The Book: The book describes the operating principles of analog MOS integrated circuits and how to design and use such circuits. The initial section explores general properties of analog MOS integrated circuits and the math and physics background required. The remainder of the book is devoted to the design of circuits. It includes such devices as switched-capacitor filters, analog-to-digital and digital-to-analog converters, amplifiers, modulators, oscillators, and others. Tables and numerical design examples clarify the step-by-step processes involved. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department.

Analog Circuit Design

Despite the fact that in the digital domain, designers can take full benefits of IPs and design automation tools to synthesize and design very complex systems, the analog designers' task is still considered as a 'handcraft', cumbersome and very time consuming process. Thus, tremendous efforts are being deployed to develop new design methodologies in the analog/RF and mixed-signal domains. This book collects 16 state-of-the-art contributions devoted to the topic of systematic design of analog, RF and mixed signal circuits. Divided in the two parts Methodologies and Techniques recent theories, synthesis techniques and design methodologies, as well as new sizing approaches in the field of robust analog and mixed signal design automation are presented for researchers and R/D engineers.

Reliability concerns and the limitations of process technology can sometimes restrict the innovation process involved in designing nano-scale analog circuits. The success of nano-scale analog circuit design requires repeat experimentation, correct analysis of the device physics, process technology, and adequate use of the knowledge database. Starting with the basics, Nano-Scale CMOS Analog Circuits: Models and CAD Techniques for High-Level Design introduces the essential fundamental concepts for designing analog circuits with optimal performances. This book explains the links between the physics and technology of scaled MOS transistors and the design and simulation of nano-scale analog circuits. It also explores the development of structured computer-aided design (CAD) techniques for architecture-level and circuit-level design of analog circuits. The book outlines the general trends of technology scaling with respect to device geometry, process parameters, and supply voltage. It describes models and optimization techniques, as well as the compact modeling of scaled MOS transistors for VLSI circuit simulation. • Includes two learning-based methods: the artificial neural network (ANN) and the least-squares support vector machine (LS-SVM) method • Provides case studies demonstrating the practical use of these two methods • Explores circuit sizing and specification translation tasks • Introduces the particle swarm optimization technique and provides examples of sizing analog circuits • Discusses the advanced effects of scaled MOS transistors like narrow width effects, and vertical and lateral channel engineering Nano-Scale CMOS Analog Circuits: Models and CAD Techniques for High-Level Design describes the models and CAD techniques, explores the physics of MOS transistors, and considers the design challenges involving statistical variations of process technology parameters and reliability constraints related to circuit design.

Market_Desc: Engineers Special Features: " Updates the coverage of bipolar technologies" Enhances the discussion of biCMOS" Provides a more unified treatment of digital and analog circuit design while strengthening the coverage of CMOS" Removes the chapter on non-linear analog circuits" Adds a new operational amplifier example to chapter 11 About The Book: This is the only comprehensive book in the market for engineers that covers CMOS, bipolar technologies, and biCMOS integrated circuits. The fifth edition retains its completeness, updates the coverage of bipolar technologies, and enhances the discussion of biCMOS. It provides a more unified treatment of digital and analog circuit design while strengthening the coverage of CMOS. The chapter on non-linear analog circuits has been removed and chapter 11 has been updated to include an operational amplifier example. With its streamlined and up-to-date coverage, more engineers can turn to this resource to explore key concepts in the field. This is the only comprehensive book in the market for engineers that covers the design of CMOS and bipolar analog integrated circuits. The fifth edition retains its completeness and updates the coverage of bipolar and CMOS circuits. A thorough analysis of a new low-voltage bipolar operational amplifier has been added to Chapters 6, 7, 9, and 11. Chapter 12 has been updated to include a fully differential folded cascode operational amplifier example. With its streamlined and up-to-date coverage, more engineers will turn to this resource to explore key concepts in the field.

Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780471321682 .

Design exibility and power consumption in addition to the cost, have always been the most important issues in design of integrated circuits (ICs), and are the main concerns of this research, as well. Energy Consumptions: Power dissipation (P) and energy consumption are - diss pecially importantwhen there is a limited amountof power budgetor limited source of energy. Very common examples are portable systems where the battery life time depends on system power consumption. Many different techniques have been - veloped to reduce or manage the circuit power consumption in this type of systems. Ultra-low power (ULP) applications are another examples where power dissipation is the primary design issue. In such applications, the power budget is so restricted that very special circuit and system level design techniquesare needed to satisfy the requirements. Circuits employed in applications such as wireless sensor networks (WSN), wearable battery powered systems [1], and implantable circuits for biol- ical applications need to consume very low amount of power such that the entire system can survive for a very long time without the need for changingor recharging battery[2–4]. Using newpowersupplytechniquessuchas energyharvesting[5]and printable batteries [6], is another reason for reducing power dissipation. Devel- ing special design techniques for implementing low power circuits [7–9], as well as dynamic power management (DPM) schemes [10] are the two main approaches to control the system power consumption. Design Flexibility: Design exibility is the other important issue in modern in- tegrated systems.

Market_Desc: · Electrical Engineers· Computer Engineers Special Features: · The new edition features coverage of cutting edge topics--more advanced CMOS device electronics to include short-channel effects, weak inversion and impact ionization· Coverage of state-of-the-art IC processes shows how modern integrated circuits are fabricated, including recent issues like heterojunction bipolar transistors, copper interconnect and low permittivity dielectric materials· Comprehensive and unified treatment of bipolar and CMOS circuits helps readers design real-world amplifiers in silicon About The Book: The text provides a comprehensive treatment of analog integrated circuit analysis and design starting from the basics and through current

industrial practices. The authors combine bipolar, CMOS and BiCMOS analog integrated-circuit design into a unified treatment that stresses their commonalities and highlights their differences. The book provides the reader with valuable insights into the relative strengths and weaknesses of these important technologies.

Engineering productivity in integrated circuit product design and development today is limited largely by the effectiveness of the CAD tools used. For those domains of product design that are highly dependent on transistor-level circuit design and optimization, such as high-speed logic and memory, mixed-signal analog-digital interfaces, RF functions, power integrated circuits, and so forth, circuit simulation is perhaps the single most important tool. As the complexity and performance of integrated electronic systems has increased with scaling of technology feature size, the capabilities and sophistication of the underlying circuit simulation tools have correspondingly increased. The absolute size of circuits requiring transistor-level simulation has increased dramatically, creating not only problems of computing power resources but also problems of task organization, complexity management, output representation, initial condition setup, and so forth. Also, as circuits of more complexity and mixed types of functionality are attacked with simulation, the spread between time constants or event time scales within the circuit has tended to become wider, requiring new strategies in simulators to deal with large time constant spreads.

- Applicable for bookstore catalogue

Intuitive Analog Circuit Design outlines ways of thinking about analog circuits and systems that let you develop a feel for what a good, working analog circuit design should be. This book reflects author Marc Thompson's 30 years of experience designing analog and power electronics circuits and teaching graduate-level analog circuit design, and is the ideal reference for anyone who needs a straightforward introduction to the subject. In this book, Dr. Thompson describes intuitive and "back-of-the-envelope" techniques for designing and analyzing analog circuits, including transistor amplifiers (CMOS, JFET, and bipolar), transistor switching, noise in analog circuits, thermal circuit design, magnetic circuit design, and control systems. The application of some simple rules of thumb and design techniques is the first step in developing an intuitive understanding of the behavior of complex electrical systems. Introducing analog circuit design with a minimum of mathematics, this book uses numerous real-world examples to help you make the transition to analog design. The second edition is an ideal introductory text for anyone new to the area of analog circuit design. Design examples are used throughout the text, along with end-of-chapter examples. Covers real-world parasitic elements in circuit design and their effects

This book has its roots in an idea first formulated by Barrie Gilbert in 1975. He showed how bipolar analog circuits can realize nonlinear and computational functions. This extended the analog art from linear to nonlinear applications, hence the name translinear circuits. Not only did this new principle enable marvellous signal processing functions to be accurately implemented, but also the circuits were simple and practical. The perennial problems of analog design, namely temperature sensitivity, processing spread, device nonlinearity and parasitic capacitance were solved to a large extent. Using the translinear principle in circuit design requires changing your point of view in two ways. First, the grossly nonlinear characteristic of transistors is viewed as an asset rather than as a harmful property. Second, no longer are the signals represented by voltages, but by currents. In fact, the attendant voltage changes are distorted but, as they are very small, they are only of secondary interest. Understanding and analyzing a given translinear circuit is fairly straightforward. But what about the converse situation: suppose you're given some nonlinear or computational function to implement? How to find a suitable translinear circuit realization? The general problem of analog circuit synthesis is a difficult one and is receiving much attention nowadays. Some years ago, I had the opportunity to investigate methods for designing bipolar translinear circuits. It turned out that

translinear networks have some unique topological properties. Using these properties it was possible to establish heuristic synthesis procedures.

Analog Integrated Circuits for Communication: Principles, Simulation and Design, Second Edition covers the analysis and design of nonlinear analog integrated circuits that form the basis of present-day communication systems. Both bipolar and MOS transistor circuits are analyzed and several numerical examples are used to illustrate the analysis and design techniques developed in this book. Especially unique to this work is the tight coupling between the first-order circuit analysis and circuit simulation results. Extensive use has been made of the public domain circuit simulator Spice, to verify the results of first-order analyses, and for detailed simulations with complex device models. Highlights of the new edition include: A new introductory chapter that provides a brief review of communication systems, transistor models, and distortion generation and simulation. Addition of new material on MOSFET mixers, compression and intercept points, matching networks. Revisions of text and explanations where necessary to reflect the new organization of the book Spice input files for all the circuit examples that are available to the reader from a website. Problem sets at the end of each chapter to reinforce and apply the subject matter. An instructors solutions manual is available on the book's webpage at springer.com. Analog Integrated Circuits for Communication: Principles, Simulation and Design, Second Edition is for readers who have completed an introductory course in analog circuits and are familiar with basic analysis techniques as well as with the operating principles of semiconductor devices. This book also serves as a useful reference for practicing engineers.

Analysis and Design of Analog Integrated Circuits John Wiley & Sons

Analog Integrated Circuits deals with the design and analysis of modern analog circuits using integrated bipolar and field-effect transistor technologies. This book is suitable as a text for a one-semester course for senior level or first-year graduate students as well as a reference work for practicing engineers. Advanced students will also find the text useful in that some of the material presented here is not covered in many first courses on analog circuits. Included in this is an extensive coverage of feedback amplifiers, current-mode circuits, and translinear circuits. Suitable background would be fundamental courses in electronic circuits and semiconductor devices. This book contains numerous examples, many of which include commercial analog circuits. End-of-chapter problems are given, many illustrating practical circuits. Chapter 1 discusses the models commonly used to represent devices used in modern analog integrated circuits. Presented are models for bipolar junction transistors, junction diodes, junction field-effect transistors, and metal-oxide semiconductor field-effect transistors. Both large-signal and small-signal models are developed as well as their implementation in the SPICE circuit simulation program. The basic building blocks used in a large variety of analog circuits are analyzed in Chapter 2; these consist of current sources, dc level-shift stages, single-transistor gain stages, two-transistor gain stages, and output stages. Both bipolar and field-effect transistor implementations are presented. Chapter 3 deals with operational amplifier circuits. The four basic op-amp circuits are analyzed: (1) voltage-feedback amplifiers, (2) current-feedback amplifiers, (3) current-differencing amplifiers, and (4) transconductance amplifiers. Selected applications are also presented.

Franco's "Design with Operational Amplifiers and Analog Integrated Circuits, 4e" combines theory with real-life applications to deliver a straightforward look at analog design principles and techniques. An emphasis on the physical picture helps the student develop the intuition and practical insight that are the keys to making sound design decisions. The book is intended for a design-oriented course in applications with operational amplifiers and analog ICs. It also serves as a comprehensive reference for practicing engineers. This new edition includes enhanced pedagogy (additional problems, more in-depth coverage of negative feedback, more effective layout), updated technology (current-feedback and folded-cascode

amplifiers, and low-voltage amplifiers), and increased topical coverage (current-feedback amplifiers, switching regulators and phase-locked loops).

Places emphasis on developing intuition and physical insight. This title includes numerous examples and problems that have been carefully thought out to promote problem solving methodologies of the type engineers apply daily on the job.

Fundamentals of Microelectronics, 2nd Edition is designed to build a strong foundation in both design and analysis of electronic circuits this text offers conceptual understanding and mastery of the material by using modern examples to motivate and prepare readers for advanced courses and their careers. The book's unique problem-solving framework enables readers to deconstruct complex problems into components that they are familiar with which builds the confidence and intuitive skills needed for success.

Electrical Engineering Integrated Circuits for Wireless Communications High-frequency integrated circuit design is a booming area of growth that is driven not only by the expanding capabilities of underlying circuit technologies like CMOS, but also by the dramatic increase in wireless communications products that depend on them. Integrated Circuits for Wireless Communications includes seminal and classic papers in the field and is the first all-in-one resource to address this increasingly important topic. Internationally known and highly regarded in the field, editors Asad Abidi, Paul Gray, and Robert G. Meyer have meticulously compiled more than 100 papers and articles covering the very latest high-level integrated circuits techniques and solutions in use today. Integrated Circuits for Wireless Communications is devised expressly to provide IC design engineers, system architects, and integrators with a practical understanding of subjects ranging from architecture choices for integrated transceivers to actual circuit designs in all viable IC technologies, such as bipolar, CMOS, and GaAs. The papers selected represent a breadth of coverage and level of expertise that is simply unmatched in the field. Topics covered include: Radio architectures Receivers Transmitters and transceivers Power amplifiers and RF switches Oscillators Passive components Systems applications

Praise for CMOS: Circuit Design, Layout, and Simulation Revised Second Edition from the Technical Reviewers "A refreshing industrial flavor. Design concepts are presented as they are needed for 'just-in-time' learning. Simulating and designing circuits using SPICE is emphasized with literally hundreds of examples. Very few textbooks contain as much detail as this one. Highly recommended!" --Paul M.

Furth, New Mexico State University "This book builds a solid knowledge of CMOS circuit design from the ground up. With coverage of process integration, layout, analog and digital models, noise mechanisms, memory circuits, references, amplifiers, PLLs/DLLs, dynamic circuits, and data converters, the text is an excellent reference for both experienced and novice designers alike."

--Tyler J. Gomm, Design Engineer, Micron Technology, Inc. "The Second Edition builds upon the success of the first with new chapters that cover additional material such as oversampled converters and non-volatile memories. This is becoming the de facto standard textbook to have on every analog and mixed-signal designer's bookshelf." --Joe Walsh, Design Engineer, AMI Semiconductor CMOS circuits from design to implementation CMOS: Circuit Design, Layout, and Simulation, Revised Second Edition covers the practical design of both analog and digital integrated circuits, offering a vital, contemporary view of a wide range of analog/digital circuit blocks, the BSIM model, data converter architectures, and much more. This edition takes a two-path approach to the topics: design

techniques are developed for both long- and short-channel CMOS technologies and then compared. The results are multidimensional explanations that allow readers to gain deep insight into the design process. Features include: Updated materials to reflect CMOS technology's movement into nanometer sizes Discussions on phase- and delay-locked loops, mixed-signal circuits, data converters, and circuit noise More than 1,000 figures, 200 examples, and over 500 end-of-chapter problems In-depth coverage of both analog and digital circuit-level design techniques Real-world process parameters and design rules The book's Web site, CMOSedu.com, provides: solutions to the book's problems; additional homework problems without solutions; SPICE simulation examples using HSPICE, LTspice, and WinSpice; layout tools and examples for actually fabricating a chip; and videos to aid learning

This newly revised and expanded edition of the 2003 Artech House classic, *Radio Frequency Integrated Circuit Design*, serves as an up-to-date, practical reference for complete RFIC know-how. The second edition includes numerous updates, including greater coverage of CMOS PA design, RFIC design with on-chip components, and more worked examples with simulation results. By emphasizing working designs, this book practically transports you into the authors' own RFIC lab so you can fully understand the function of each design detailed in this book. Among the RFIC designs examined are RF integrated LC-based filters, VCO automatic amplitude control loops, and fully integrated transformer-based circuits, as well as image reject mixers and power amplifiers. If you are new to RFIC design, you can benefit from the introduction to basic theory so you can quickly come up to speed on how RFICs perform and work together in a communications device. A thorough examination of RFIC technology guides you in knowing when RFICs are the right choice for designing a communication device. This leading-edge resource is packed with over 1,000 equations and more than 435 illustrations that support key topics."

This new book on *Analog Circuit Design* contains the revised contributions of all the tutorial speakers of the eight workshop AACD (Advances in Analog Circuit Design), which was held at Nice, France on March 23-25, 1999. The workshop was organized by Yves Leduc of TI Nice, France. The program committee consisted of Willy Sansen, K.U.Leuven, Belgium, Han Huijsing, T.U.Delft, The Netherlands and Rudy van de Plassche, T.U.Eindhoven, The Netherlands. The aim of these AACD workshops is to bring together a restricted group of about 100 people who are personally advancing the frontiers of analog circuit design to brainstorm on new possibilities and future developments in a restricted number of fields. They are concentrated around three topics. In each topic six speakers give a tutorial presentation. Eighteen papers are thus included in this book. The topics of 1999 are: (X)DSL and other communication systems RF MOST models Integrated filters and oscillators The other topics, which have been covered before, are: 1992 Operational amplifiers A-D Converters Analog CAD 1993 Mixed-mode A+D design Sensor interfaces Communication circuits 1994 Low-power low-

voltage design Integrated filters Smart power 1995 Low-noise low-power low-voltage design Mixed-mode design with CAD tools Voltage, current and time references vii viii 1996 RF CMOS circuit design Bandpass sigma-delta and other data converters Translinear circuits 1997 RF A-D Converters Sensor and actuator interfaces Low-noise oscillators, PLL's and synthesizers 1998 I-Volt electronics Design and implementation of mixed-mode systems Low-noise amplifiers and RF power amplifiers for telecommunications

This modern, pedagogic textbook from leading author Behzad Razavi provides a comprehensive and rigorous introduction to CMOS PLL design, featuring intuitive presentation of theoretical concepts, extensive circuit simulations, over 200 worked examples, and 250 end-of-chapter problems. The perfect text for senior undergraduate and graduate students.

The analysis and prediction of nonlinear behavior in electronic circuits has long been a topic of concern for analog circuit designers. The recent explosion of interest in portable electronics such as cellular telephones, cordless telephones and other applications has served to reinforce the importance of these issues. The need now often arises to predict and optimize the distortion performance of diverse electronic circuit configurations operating in the gigahertz frequency range, where nonlinear reactive effects often dominate. However, there have historically been few sources available from which design engineers could obtain information on analysis techniques suitable for tackling these important problems. I am sure that the analog circuit design community will thus welcome this work by Dr. Wambacq and Professor Sansen as a major contribution to the analog circuit design literature in the area of distortion analysis of electronic circuits. I am personally looking forward to having a copy readily available for reference when designing integrated circuits for communication systems.

Improve your circuit-design potential with this expert guide to the devices and technology used in mixed analog-digital VLSI chips for such high-volume applications as hard-disk drives, wireless telephones, and consumer electronics. The book provides you with a critical understanding of device models, fabrication technology, and layout as they apply to mixed analog-digital circuits. You will learn about the many device-modeling requirements for analog work, as well as the pitfalls in models used today for computer simulators such as Spice. Also included is information on fabrication technologies developed specifically for mixed-signal VLSI chips, plus guidance on the layout of mixed analog-digital chips for a high degree of analog-device matching and minimum digital-to-analog interference. This reference book features an intuitive introduction to MOSFET operation that will enable you to view with insight any MOSFET model? besides thorough discussions on valuable large-signal and small-signal models. Filled with practical information, this first-of-its-kind book will help you grasp the nuances of mixed-signal VLSI-device models and layout that are crucial to the design of high-performance chips.

The Fifth Edition of this academically rigorous text provides a comprehensive

treatment of analog integrated circuit analysis and design starting from the basics and through current industrial practices. The authors combine bipolar, CMOS and BiCMOS analog integrated-circuit design into a unified treatment that stresses their commonalities and highlights their differences. The comprehensive coverage of the material will provide the student with valuable insights into the relative strengths and weaknesses of these important technologies.

Very fast advances in IC technologies have brought new challenges into the physical design of integrated systems. The emphasis on system performance, in lately developed applications, requires timing and power constraints to be considered at each stage of physical design. The size of ICs is decreasing continuously, and the density of power dissipated in the circuits is growing rapidly. The first challenge is the Information Technology where new materials, devices, telecommunication and multimedia facilities are developed. The second one is the Biomedical Science and Biotechnology. The utilisation of bloodless surgery is possible now because of wide micro-sensors and micro-actuators application. Nowadays, the modern micro systems can be implanted directly into the human body and the medicine can be applied right in the proper time and place in the patient body. The low-power devices are being developed particularly for medical and space applications. This has created for designers in all scientific domains new possibilities which must be handed down to the future generations of designers. In this spirit, we organised the Fourth International Workshop "MIXED DESIGN OF INTEGRATED CIRCUITS AND SYSTEMS" in order to provide an international forum for discussion and the exchange of information on education, teaching experiences, training and technology transfer in the area of microelectronics and microsystems.

The purpose of this book is to provide a complete working knowledge of the Complementary Metal-Oxide Semiconductor (CMOS) analog and mixed-signal circuit design, which can be applied for System on Chip (SOC) or Application-Specific Standard Product (ASSP) development. It begins with an introduction to the CMOS analog and mixed-signal circuit design with further coverage of basic devices, such as the Metal-Oxide Semiconductor Field-Effect Transistor (MOSFET) with both long- and short-channel operations, photo devices, fitting ratio, etc. Seven chapters focus on the CMOS analog and mixed-signal circuit design of amplifiers, low power amplifiers, voltage regulator-reference, data converters, dynamic analog circuits, color and image sensors, and peripheral (oscillators and Input/Output [I/O]) circuits, and Integrated Circuit (IC) layout and packaging. Features: Provides practical knowledge of CMOS analog and mixed-signal circuit design Includes recent research in CMOS color and image sensor technology Discusses sub-blocks of typical analog and mixed-signal IC products Illustrates several design examples of analog circuits together with layout Describes integrating based CMOS color circuit

This book presents the first comprehensive treatment of analog VLSI design for signal and information processing applications by blending the basic design concepts of both traditional and contemporary analog VLSI. The breadth and level of details of topics covered are unique, reflecting the birth of a new generation of analog VLSI circuits. Each chapter provides basic introductory material in a tutorial manner, with examples or case studies at the circuit and/or system level. Outstanding features of the text include coverage of the latest in analog VLSI putting students and practicing engineers on the

cutting edge of this exciting field; thorough coverage of topics unique to this book including low-voltage, BiCMOS, current-mode and neural information processing, oversampled data converters, statistical design, analog testability, analog CAD, analog layout, and analog VLSI interconnects; avoids lengthy coverage of device physics and IC fabrication and goes straight to the design and applications of analog VLSI circuits; extensive use of SPICE in numerous examples and problem sets; worked examples (from a realistic-silicon chip) and end-of-chapter problems assist reader comprehension; and an instructor's manual containing a complete listing of problem solutions and SPICE netlists.

This edition combines the consideration of metal-oxide-semiconductors (MOS) and bipolar circuits into a unified treatment that also includes MOS-bipolar connections made possible by BiCMOS technology. Contains extensive use of SPICE, especially as an integral part of many examples in the problem sets as a more accurate check on hand calculations and as a tool to examine complex circuit behavior beyond the scope of hand analysis. Concerned largely with the design of integrated circuits, a considerable amount of material is also included on applications.

For Electrical Engineering courses in analog layout or professional layout designers. This text covers the issues involved in successfully laying out analog integrated circuits. Hastings provides clear guidance and does not stress theoretical physics or mathematical analysis of layouts. He emphasizes cross-sections of devices and carrier-based models of device operation as compared to the more common geometric and schematic representation of devices.

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