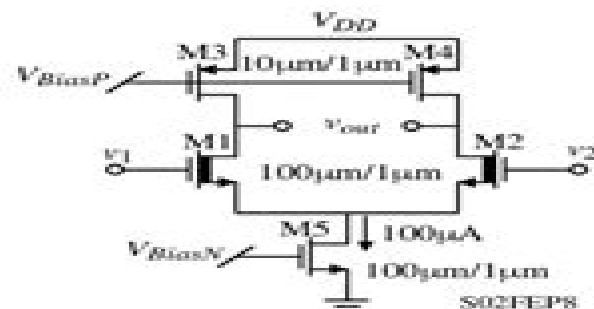


Homework Assignment No. 13

Due Friday, April 18, 2003 in class

Problem 1 - (10 points)

A differential CMOS amplifier using depletion mode input devices is shown. Assume that the normal MOSFETs parameters are $K_N' = 110\text{V}/\mu\text{A}^2$, $V_{TN} = 0.7\text{V}$, $\lambda_N = 0.04\text{V}^{-1}$ and for the PMOS transistors are $K_P' = 50\text{V}/\mu\text{A}^2$, $V_{TP} = -0.7\text{V}$, $\lambda_P = 0.05\text{V}^{-1}$. For the depletion mode NMOS transistors, the parameters are the same as the normal NMOS except that $V_{TN} = -0.5\text{V}$. (a.) What is the maximum input common-mode voltage, $V_{icm}^*(\text{max})$? (b.) What is the minimum input common-mode voltage, $V_{icm}^*(\text{min})$? (c.) What value of V_{DD} gives an $ICMR = 0.5V_{DD}$?



Problem 2 - (10 points)

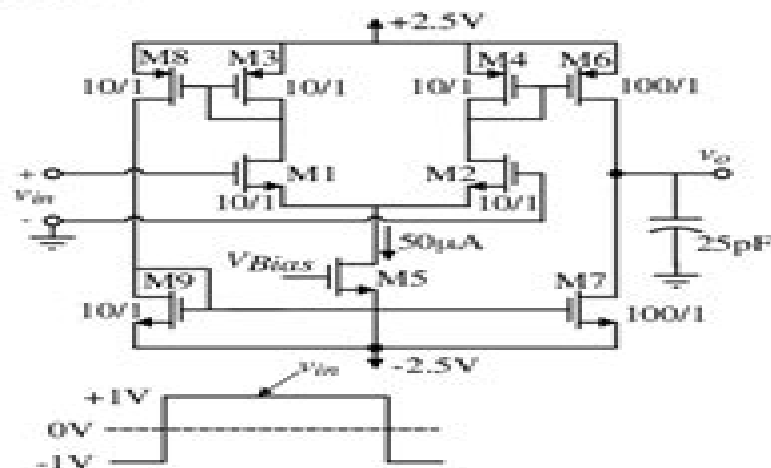
Problem 8.2-2 of Allen and Holberg, 2nd edition

Problem 3 - (10 points)

Problem 8.2-8 of Allen and Holberg, 2nd edition.

Problem 4 - (10 points)

The comparator shown has an input applied as shown. Assuming the the pulse width is wide enough, calculate the propagation delay time for this comparator. Assume that the trip point of the output is at 0V .



Analog Integrated Circuit Design Problem Answers

JG Myers



Analog Integrated Circuit Design Problem Answers:

Analysis and Design of Analog Integrated Circuits Paul R. Gray, Paul J. Hurst, Stephen H. Lewis, Robert G. Meyer, 2024-01-04 ANALYSIS AND DESIGN OF ANALOG INTEGRATED CIRCUITS Authoritative and comprehensive textbook on the fundamentals of analog integrated circuits with learning aids included throughout Written in an accessible style to ensure complex content can be appreciated by both students and professionals this Sixth Edition of Analysis and Design of Analog Integrated Circuits is a highly comprehensive textbook on analog design offering in depth coverage of the fundamentals of circuits in a single volume To aid in reader comprehension and retention supplementary material includes end of chapter problems plus a Solution Manual for instructors In addition to the well established concepts this Sixth Edition introduces a new super source follower circuit and its large signal behavior frequency response stability and noise properties New material also introduces replica biasing describes and analyzes two op amps with replica biasing and provides coverage of weighted zero value time constants as a method to estimate the location of dominant zeros pole zero doublets including their effect on settling time and three examples of circuits that create doublets the effect of feedback on pole zero doublets and MOS transistor noise performance including a thorough treatment on thermally induced gate noise Providing complete coverage of the subject Analysis and Design of Analog Integrated Circuits serves as a valuable reference for readers from many different types of backgrounds including senior undergraduates and first year graduate students in electrical and computer engineering along with analog integrated circuit designers

CMOS Analog Circuit Design Holberg Allen, Phillip E. Allen, Douglas R. Holberg, 1995-06 After years of anticipation respected authors Phil Allen and Doug Holberg bring you the second edition of their popular textbook CMOS Analog Circuit Design From the forefront of CMOS technology Phil and Doug have combined their expertise as engineers and academics to present a cutting edge and effective overview of the principles and techniques for designing circuits Their two main goals are DT to mix the academic and practical viewpoints in a treatment that is neither superficial nor overly detailed andDT to teach analog integrated circuit design with a hierarchically organized approach Most of the techniques and principles presented in the second edition have been taught over the last ten years to industry members Their needs and questions have greatly shaped the revision process making this new edition a valuable resource for practicing engineers The trademark approach of Phil and Doug s textbook is its design recipes which take readers step by step through the creation of real circuits explaining complex design problems The book provides detailed coverage of often neglected areas and deliberately leaves out bipolar analog circuits since CMOS is the dominant technology for analog integrated circuit design Appropriate for advanced undergraduates and graduate students with background knowledge in basic electronics including biasing modeling circuit analysis and frequency response CMOS Analog Circuit Design Second Edition presents a complete picture of design including modeling simulation and testing and enables readers to design an analog circuit that can be implemented by CMOS technology FeaturesDT Orients the experience of the

expert within the perspective of design methodologyDT Identifies common mistakes made by beginning designersDT Provides problems with each chapter that reinforce and develop student understandingDT Contains numerous problems that can be used as homework quiz or exam problemsDT Includes a new section on switched capacitor circuitsDT Includes helpful appendices that provide simulation techniques and the following supplemental material A brief review of circuit analysis for CMOS analog designA calculator program for analyzing CMOS circuitsA summary of time frequency domain relationships for second order systems

CMOS Analog Circuit Design Phillip E. Allen,Douglas R. Holberg,2012-07-19 This work presents an effective overview of the principles and techniques for designing circuits to be implemented in CMOS technology It explains the methodology of analogue integrated circuit design by using a hierarchically organised approach

Analog Integrated Circuit Design Tony Chan Carusone,David Johns,Kenneth Martin,2011-12-13 When first published in 1996 this text by David Johns and Kenneth Martin quickly became a leading textbook for the advanced course on Analog IC Design This new edition has been thoroughly revised and updated by Tony Chan Carusone a University of Toronto colleague of Drs Johns and Martin Dr Chan Carusone is a specialist in analog and digital IC design in communications and signal processing This edition features extensive new material on CMOS IC device modeling processing and layout Coverage has been added on several types of circuits that have increased in importance in the past decade such as generalized integer N phase locked loops and their phase noise analysis voltage regulators and 1 5b per stage pipelined A D converters Two new chapters have been added to make the book more accessible to beginners in the field frequency response of analog ICs and basic theory of feedback amplifiers

Analog Integrated Circuit Design Automation Ricardo Martins,Nuno Lourenço,Nuno Horta,2016-07-20 This book introduces readers to a variety of tools for analog layout design automation After discussing the placement and routing problem in electronic design automation EDA the authors overview a variety of automatic layout generation tools as well as the most recent advances in analog layout aware circuit sizing The discussion includes different methods for automatic placement a template based Placer and an optimization based Placer a fully automatic Router and an empirical based Parasitic Extractor The concepts and algorithms of all the modules are thoroughly described enabling readers to reproduce the methodologies improve the quality of their designs or use them as starting point for a new tool All the methods described are applied to practical examples for a 130nm design process as well as placement and routing benchmark sets

Computer-Aided Design of Analog Integrated Circuits and Systems Rob A. Rutenbar,Georges G. E. Gielen,2002-05-06 The tools and techniques you need to break the analog design bottleneck Ten years ago analog seemed to be a dead end technology Today System on Chip SoC designs are increasingly mixed signal designs With the advent of application specific integrated circuits ASIC technologies that can integrate both analog and digital functions on a single chip analog has become more crucial than ever to the design process Today designers are moving beyond hand crafted one transistor at a time methods They are using new circuit and physical synthesis tools to design practical analog circuits new modeling and

analysis tools to allow rapid exploration of system level alternatives and new simulation tools to provide accurate answers for analog circuit behaviors and interactions that were considered impossible to handle only a few years ago To give circuit designers and CAD professionals a better understanding of the history and the current state of the art in the field this volume collects in one place the essential set of analog CAD papers that form the foundation of today s new analog design automation tools Areas covered are Analog synthesis Symbolic analysis Analog layout Analog modeling and analysis Specialized analog simulation Circuit centering and yield optimization Circuit testing Computer Aided Design of Analog Integrated Circuits and Systems is the cutting edge reference that will be an invaluable resource for every semiconductor circuit designer and CAD professional who hopes to break the analog design bottleneck Parallel Solution of Integral Equation-Based EM Problems in the Frequency Domain Y. Zhang,T. K. Sarkar,2009-06-29 A step by step guide to parallelizing cem codes The future of computational electromagnetics is changing drastically as the new generation of computer chips evolves from single core to multi core The burden now falls on software programmers to revamp existing codes and add new functionality to enable computational codes to run efficiently on this new generation of multi core CPUs In this book you ll learn everything you need to know to deal with multi core advances in chip design by employing highly efficient parallel electromagnetic code Focusing only on the Method of Moments MoM the book covers In Core and Out of Core LU Factorization for Solving a Matrix Equation A Parallel MoM Code Using RWG Basis Functions and ScaLAPACK Based In Core and Out of Core Solvers A Parallel MoM Code Using Higher Order Basis Functions and ScaLAPACK Based In Core and Out of Core Solvers Turning the Performance of a Parallel Integral Equation Solver Refinement of the Solution Using the Conjugate Gradient Method A Parallel MoM Code Using Higher Order Basis Functions and Plapack Based In Core and Out of Core Solvers Applications of the Parallel Frequency Domain Integral Equation Solver Appendices are provided with detailed information on the various computer platforms used for computation a demo shows you how to compile ScaLAPACK and PLAPACK on the Windows operating system and a demo parallel source code is available to solve the 2D electromagnetic scattering problems Parallel Solution of Integral Equation Based EM Problems in the Frequency Domain is indispensable reading for computational code designers computational electromagnetics researchers graduate students and anyone working with CEM software **Integrated Circuits MCQ (Multiple Choice Questions)** Arshad Iqbal, The Integrated Circuits Multiple Choice Questions MCQ Quiz with Answers PDF Integrated Circuits MCQ PDF Download Quiz Questions Chapter 1 2 Practice Tests with Answer Key Electronics Questions Bank MCQs Notes includes revision guide for problem solving with hundreds of solved MCQs Integrated Circuits MCQ with Answers PDF book covers basic concepts analytical and practical assessment tests Integrated Circuits MCQ PDF book helps to practice test questions from exam prep notes The Integrated Circuits MCQs with Answers PDF eBook includes revision guide with verbal quantitative and analytical past papers solved MCQs Integrated Circuits Multiple Choice Questions and Answers MCQs PDF Free download chapter 1 a

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