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Circuit analysis is the process of finding all the currents and voltages in a network of connected

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components. We look at the basic elements used to build circuits, and find out what happens when elements are connected together into a circuit.

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electrical machines - ii by u.a.bakshi m.v.bakshi pdf admin Posted on August 4, 2020 Single Phase

Transformers - Construction and operation: Singh has transformers - types - constructional details - minimization of hysteresis and eddy current. , Technical Publications, Chapter 6 Basic Concepts in Rotating

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Machines 61 to 6.

The importance of Electrical Circuit Analysis is well known in the various engineering fields. The book provides comprehensive coverage of mesh and node analysis, various network theorems, analysis of first and second order networks using time and Laplace domain, steady state analysis of a.c. circuits, coupled circuits and dot conventions, network functions, resonance and two port network parameters. The book starts with explaining the network simplification

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techniques including mesh analysis, node analysis and source shifting. Then the book explains the various network theorems and concept of duality. The book also covers the solution of first and second order networks in time domain. The sinusoidal steady state analysis of electrical circuits is also explained in the book. The book incorporates the discussion of coupled circuits and dot conventions. The Laplace transform plays an important role in the network analysis. The chapter on Laplace transform includes properties of Laplace transform and its

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application in the network analysis. The book includes the discussion of network functions of one and two port networks. The book incorporates the detailed discussion of resonant circuits. The book covers the various aspects of two port network parameters along with the conditions of symmetry and reciprocity. It also derives the interrelationships between the two port network parameters. The book uses plain and lucid language to explain each topic. Each chapter gives the conceptual knowledge about the topic dividing it in various sections and subsections.

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The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. The variety of solved examples is the feature of this book. The book explains the philosophy of the subject which makes the understanding of the subject very clear and makes the subject more interesting.

Basic Circuit Concepts
Lumped circuits-circuit elements, ideal sources (independent and dependent), linear passive parameters R , L and C ; V - I relationship of circuit elements; sinusoidal voltage and current; RMS

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value; form factor;
Kirchoff's Laws; analysis of series and parallel circuits - network reduction; voltage and current division, source transformation, star/delta transformation. Transient Analysis of First and Second Order Circuits Source free response of RL and RC circuits; forced (step) response of RL and RC circuits; source free response of RLC series circuit; forced (step) response of RLC series circuit; forced response of RL, RC and RLC series circuit to sinusoidal excitation; time constant and natural frequency of oscillation of circuits.

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Laplace Transform

application to the solution of RL, RC and RLC circuits - initial and final value theorems and applications, concept of complex frequency, driving point and transfer impedance, poles and zeros of network function. Sinusoidal Steady State Analysis Concept of phasor and complex impedance/admittance; Analysis of simple series and parallel circuits - active power, reactive power, apparent power (volt ampere), power factor and energy associated with these circuits; concept of complex power phasor diagram, impedance triangle and power

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triangle associated with these circuits. Resonance in series and parallel circuits - Q factor, half-power frequencies and bandwidth of resonant circuits. Multi Dimensional Circuit Analysis and Network Theorems Node-voltage analysis of multi mode circuit with current sources, rules for constructing nodal admittance matrix $[Y]$ for solving matrix equation $[Y]V=I$, mesh-current analysis of multi node circuits with voltage sources, rules for constructing mesh impedance matrix $[Z]$ for solving matrix equation $[Z]I=V$. Superposition theorem,

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Thévenin's theorem, Norton's theorem, Reciprocity theorem, Compensation theorem, Tellegen's theorem, Millman's theorem, maximum power transfer theorem for variable resistance load, variable impedance load and variable resistance and fixed reactance load. Coupled Circuits and Three Phase Circuits Coupled circuits - mutual inductance, coefficient of coupling, dot convention; analysis of simple coupled circuits. Three phase circuits - three phase balanced / unbalanced voltage sources, symmetrical components, analysis of three phase 3-wire and 4-wire circuits with star

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and delta connected loads (balanced and unbalanced), phasor diagram of voltages and currents, power and power factor measurements in three phase circuits.

Single Stage Amplifiers
Review, Small signal analysis of junction transistor, Frequency response of common emitter amplifier, Common base amplifier, Common collector amplifier, JFET amplifiers, Common drain (CD) amplifier, Common gate amplifier, gain band-width product. Multistage Amplifiers Multi stage amplifiers, Methods of inter stage coupling, n-stage

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cascode amplifier,
Equivalent circuits,
Miller's theorem, Frequency effects, Amplifier analysis, High input resistance transistor circuits, Cascode - transistor configuration, CE-CC amplifiers, Two stage RC coupled JFET amplifier (in common source (CS) configuration), Difference amplifier. High Frequency Transistor Circuits Transistor at high frequencies, Hybrid- common emitter, Transconductance model, Determination of hybrid- conductances, Variation of Hybrid parameters with $|I_C|$, $|V_{CE}|$ and temperature. The parameters f_T , expression for f ,

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Current gain with resistance load, CE short circuit current gain, Hybrid - (π) parameters, Measurement of f_T variation of Hybrid-parameters with Voltage, Current and temperature, Design of high frequency amplifier. Power Amplifiers Class A power amplifier, Maximum value of efficiency of class a amplifier, Transformer coupled amplifier, Transformer coupled audio amplifier, Push pull amplifier, Complimentary symmetry circuits (Transformer less class B power amplifier), Phase inverters, Class D operation, Class S

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operation, Heat sinks. Tuned Amplifiers - I Single tuned capacitive coupled amplifier, Tapped single tuned capacitance coupled amplifier, Single tuned transformer coupled or inductively coupled amplifier, CE double tuned amplifier, Application of tuned amplifiers. Tuned Amplifiers - II Stagger tuning, Stability considerations, Tuned Class B and Class C amplifiers, Wideband amplifiers, Tuned amplifiers. Voltage Regulators Terminology, Basic regulator circuit, Short circuit protection, Current limiting, Specifications of voltage regulator circuits,

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Voltage

multipliers. Switching and IC Voltage Regulators IC 723 voltage regulators and three terminal IC regulators, DC to DC converter, Switching regulators, Voltage Multipliers, UPS, SMPS.

The book, now in its Second Edition, presents the concepts of electrical circuits with easy-to-understand approach based on classroom experience of the authors. It deals with the fundamentals of electric circuits, their components and the mathematical tools used to represent and analyze electrical circuits. This text guides students to

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analyze and build simple electric circuits. The presentation is very simple to facilitate self-study to the students. A better way to understand the various aspects of electrical circuits is to solve many problems. Keeping this in mind, a large number of solved and unsolved problems have been included. The chapters are arranged logically in a proper sequence so that successive topics build upon earlier topics. Each chapter is supported with necessary illustrations. It serves as a textbook for undergraduate engineering students of multiple disciplines for a

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course on 'circuit theory' or 'electrical circuit analysis' offered by major technical universities across the country. SALIENT FEATURES • Difficult topics such as transients, network theorems, two-port networks are presented in a simple manner with numerous examples. • Short questions with answers are provided at the end of every chapter to help the students to understand the basic laws and theorems. • Annotations are given at appropriate places to ensure that the students get the gist of the subject matter clearly. NEW TO THE SECOND EDITION • Incorporates several new

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solved examples for better understanding of the subject

- Includes objective type questions with answers at the end of the chapters
- Provides an appendix on 'Laplace Transforms'

The book covers all the aspects of theory, analysis, and design of Electronic Circuits for the undergraduate course. It provides all the essential information required to understand the operation and perform the analysis and design of a wide range of electronic circuits, including MOSFET as a switching and amplifier circuits, feedback

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amplifiers, oscillators, voltage regulators, operational amplifiers and its applications, DAC, ADC, and Phase-Locked Loop. The book is divided into four parts. The first part focuses on the fundamental concepts of MOSFET, MOSFET construction, characteristics, and circuits - as a switch, as a resistor/diode, as an amplifier, and current sink and source circuits. The second part focuses on the analysis of voltage-series and current-series feedback amplifiers. It also explains the Barkhausen criterion for oscillation and incorporates the detailed analysis of

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Wien bridge and phase-shift oscillators. The third part is dedicated to the basics of op-amp and a discussion of a variety of its applications. The fourth part focuses on the V to I and I to V Converters, DAC and ADC, and Phase-Locked Loop. The book uses straightforward and lucid language to explain each topic. The book provides the logical method of describing the various complicated issues and stepwise methods to make understanding easy. The variety of solved examples is the feature of this book. The book explains the subject's philosophy, which makes understanding

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The concepts evident and makes the subject more interesting.

Electrical and instrumentation engineering is changing rapidly, and it is important for the veteran engineer in the field not only to have a valuable and reliable reference work which he or she can consult for basic concepts, but also to be up to date on any changes to basic equipment or processes that might have occurred in the field. Covering all of the basic concepts, from three-phase power supply and its various types of connection and conversion, to power

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equation and discussions of the protection of power system, to transformers, voltage regulation, and many other concepts, this volume is the one-stop, "go to" for all of the engineer's questions on basic electrical and instrumentation engineering. There are chapters covering the construction and working principle of the DC machine, all varieties of motors, fundamental concepts and operating principles of measuring, and instrumentation, both from a "high end" point of view and the point of view of developing countries, emphasizing low-cost

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methods. A valuable reference for engineers, scientists, chemists, and students, this volume is applicable to many different fields, across many different industries, at all levels. It is a must-have for any library.

Electronic Circuit Analysis is designed to serve students of a two semester undergraduate course on electronic circuit analysis. It builds on the subject from its basic principles over fifteen chapters, providing detailed coverage on the design and analysis of electronic circuits.

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The book covers all the aspects of Network Analysis for undergraduate course. The book provides comprehensive coverage of network analysis and simplification techniques, network theorems, graph theory, transient analysis, filters, attenuators, Laplace transform, network functions and two port network parameters with the help of large number of solved problems. The book starts with explaining the various network simplification techniques including mesh analysis, node analysis and source shifting. The basics of a.c. fundamentals are also

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explained in support. The book covers the various network theorems. Then the book explains the graph theory, its application in network analysis along with the concept of duality. The transient analysis of various networks is also explained in the book. The book incorporates the detailed discussion of resonant circuits. The book also explains the theory of four terminal networks, filters and attenuators. The Laplace transform plays an important role in the network analysis. The chapter on Laplace transform includes properties of Laplace transform and its

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application in the network analysis. The book includes the discussion of network functions of one and two port networks. The book covers the various aspects of two port network parameters along with the conditions of symmetry and reciprocity. It also derives the interrelationships between the two port network parameters. The book uses plain and lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. The variety of solved examples is the feature of this book.

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The book explains the philosophy of the subject which makes the understanding of the subject very clear and makes the subject more interesting. The students have to omit nothing and possibly have to cover nothing more.

Simplification and Analysis Techniques (A.C. and D.C. Circuits) Sinusoidal steady state. Phasors & phasor diagram. Energy sources. Mesh and nodal analysis. Source transformation. Network theorems.1) Superposition theorem.2) Thevenin's theorem.3) Norton's theorem.4) Maximum power transfer theorem. Resonance

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and Applications
Definition of figure of merit, Q .
Series resonance : Current bandwidth, Impedance, & selectivity in series resonance. Parallel (anti) resonance : Application of resonance circuits including impedance transformation. Transient Response Initial conditions in elements. A procedure for evaluating initial conditions. Solution of RC, RL, RLC step response using classical method. Solution of RC, RL, RLC step response using Laplace transform. Four Terminal Networks Classification of four terminal networks (Symmetrical, asymmetrical, balance

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Index & Contents

unbalanced) Characteristic impedance & propagation constant for symmetrical networks. Image & iterative impedance for symmetrical networks. Filter fundamentals : Constant K type low-pass filter. Constant K type high pass filter. Constant K type band pass filter. Constant K type band stop filter. M-derived T and sections of low pass filter. Composite low pass filter. Attenuators : Introduction. Nepers & decibels. Symmetrical T & type attenuators. Network Functions Terminal pairs and ports. Network functions for one and two port

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networks. Poles & zeros of network function. Time domain behaviour from pole zero plot. Two Port Network Parameters Introduction. Open circuit impedance parameters. Short circuit admittance parameters. Hybrid parameters. Transmission parameters. Inter-relation between different parameters. Interconnection of two port networks.

The book covers all the aspects of theory, analysis, and design of Electron Devices and Circuits for the undergraduate course. The concepts of p-n junction devices, BJT, JFET, MOSFET,

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Electronic devices including UJT, thyristors, IGBT, Amplifier circuits-BJT, JFET and MOSFET amplifiers, multistage and differential amplifiers, feedback amplifiers, and oscillators are explained comprehensively. The book explains various p-n junction devices, including diode, LED, laser diode, Zener diode, and Zener diode regulator. The different types of rectifiers are explained in support. The book covers the construction, operation, and characteristics of BJT, JFET, MOSFET, UJT, Thyristors - SCR, Diac and Triac, and IGBT. It explains

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The biasing of BJT, JFET, and MOSFET amplifiers, basic BJT, JFET, and MOSFET amplifiers with h-parameters and r-parameters equivalent circuits, multistage amplifiers, differential amplifiers, BiCMOS amplifier, single tuned amplifiers, neutralization methods, power amplifiers, and frequency response. Finally, the book incorporates a detailed discussion of the analysis of the current series, voltage series, current shunt, and voltage shunt feedback amplifiers. The book also includes the discussion of the Barkhausen criterion for oscillations

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and the detailed analysis of various oscillator circuits, including RC phase shift, Wien bridge, Hartley, Colpitt's, Clapp, and crystal oscillators. The book uses straightforward and lucid language to explain each topic. The book provides the logical method of describing the various complicated issues and stepwise methods to make understanding easy. The variety of solved examples is the feature of this book. The book explains the subject's philosophy, which makes understanding the concepts evident and makes the subject more interesting.

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