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 - Series and parallel combinations
 - Network connections
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- Superposition theorem

Key concepts:

Voltage • Current • Resistance • Conductance • Capacitance • Inductance •
Kirchhoff's laws • Nodal analysis • Controlled sources • Thévenin
equivalent • Norton equivalent • Superposition

Chapter 2 — Complex Numbers: An Introduction

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Key concepts:

Complex numbers · Real and imaginary parts · Cartesian form · Polar form · Exponential form · Magnitude · Phase · Euler's formula · Complex algebra

Chapter 3 — Frequency-Domain Electrical Signal and Circuit Analysis

- Sinusoidal AC analysis
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- Signal and circuit bandwidth
- Linear distortion
- Bode plots
- Fourier transform
- Transfer function
- Impulse response
- Convolution

Ce chapitre est particulièrement important car il fait le lien entre **circuit analysis**, **signal processing** et **system theory**.

Key concepts:

AC circuits · RMS · Phasors · Impedance · Admittance · Maximum power transfer · Fourier series · Fourier transform · Bandwidth · Bode plots · Transfer function · Impulse response · Convolution · Frequency response

Chapter 4 — Natural and Forced Response Circuit Analysis

- Time-domain analysis
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- Fourier-transform approach
- Laplace transform
- Circuit analysis using Laplace transforms

Key concepts:

Time-domain analysis · Natural response · Forced response · Transient response · Steady-state response · Laplace transform · Fourier transform · Initial conditions · Poles · Zeros

Chapter 5 — Electrical Two-Port Network Analysis

- Two-port networks
- Electrical representations
- Two-port parameters
- Network modelling
- Computer-aided electrical analysis

Key concepts:

Two-port networks · Network parameters · Z-parameters · Y-parameters · h-parameters · ABCD parameters · Network modelling · Computer-aided analysis

Chapter 6 — Basic Electronic Amplifier Building Blocks

- Modelling the amplification process
- Operational amplifiers
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- Amplifier modelling

Key concepts:

Amplifiers · Voltage gain · Current gain · Power gain · Operational amplifiers · Op-amps · Active devices · Small-signal model · Input impedance · Output impedance · Feedback

Chapter 7 — RF Circuit Analysis Techniques

- Introduction to RF circuits
- Lumped versus distributed circuits
- Ideal transmission-line model
- Scattering parameters
- Smith chart

Key concepts:

RF circuits · Radio frequency · Lumped circuits · Distributed circuits ·

Transmission lines • Characteristic impedance • Reflection coefficient • S-parameters • Smith chart • Impedance matching • RF modelling

This chapter represents the transition from conventional low-frequency circuit analysis toward **RF and microwave circuit analysis**.

Chapter 8 — Noise in Electronic Circuits

- Random variables
- Stochastic processes
- Noise in electronic circuits
- Noise modelling
- Computer-aided noise analysis