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Politecnico di Torino

Academic Year 2010/11 (first time established in A.Y.2007/08)

01MBMJA

Electric circuits I

1st degree and Bachelor-level of the Bologna process in Electronic And Computer Engineering - Vercelli (III FACOLTA' DI INGEGNERIA)

Teacher	Status	SSD	Les	Ex	Lab	Years Stability
Grivet Talocia Stefano	AC	ING-IND/31	5	4	0	3

SSD	CFU	Activities	Area context
ING-IND/31	9	C - Affini o integrative	Discipline ingegneristiche

Objectives of the course

The general methodologies for the analysis of electrical circuits are presented. The teaching strategy is based on the use of induction and on examples: active participation and interaction is expected during the lectures, since the theoretical parts are complemented by many practical examples that should be solved by the students during collaborative group exercises.

Expected skills

The student should acquire the capability of manually solving simple circuits by hand calculations, and more complex circuits with the aid of a circuit simulator. Expected skills include general analysis methods of electric circuits under constant, sinusoidal, and arbitrary excitations. The course material is essential for a basic understanding of the electronic applications that will be encountered by the student in successive courses.

Prerequisites

Calculus I and II, Electromagnetism and Optics, Linear Algebra

Syllabus

Voltage, current, power. Kirchhoff laws. Basic circuit elements: resistors and ideal voltage and current sources. Series and parallel connections. Nodal analysis. Millmann's Theorem. Linearity and Superposition. Thevenin's and Norton's theorems. Dependent sources. Operational amplifiers. Diodes. Operating point and differential resistance. Capacitors and inductors. First-order circuits. Second-order circuits. Sinusoids and phasors. Impedance and admittance. Sinusoidal steady-state analysis. AC power analysis. Laplace transform and its application to general circuit analysis. Network functions and their properties. Two-port and multi-port networks

Laboratories and/or exercises

The entire course program is the subject of several in-class group exercise sessions. A few computer lab hours are dedicated to the circuit simulator SPICE. Weekly sessions will be organized for group exercises under the supervision of a tutor.

Bibliography

Official course textbook (systematically used by the instructor):
C.K. Alexander, M.N.O. Sadiku, Fundamentals of electric circuits, Third edition, McGraw-Hill, 2007 (www.mhhe.com/alexander)
Additional texts:
Charles A. Desoer and Ernest S. Kuh, Basic circuit theory. McGraw-Hill, 1969

Revisions / Exam

The exam is structured in a written test (two hours) followed by an oral test. The written part includes both elementary tests and more complex circuits to be solved manually. No consultation of textbooks or notes is allowed during the written test. A positive score on the written test allows access to the oral test, aimed at the in-depth verification of the competencies acquired by the student.

Programma definitivo per l'A.A.2010/11



