Electric Circuits 1

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1. Course Description

The electric circuits are indispensable to understand electronics and to design electronic circuits.
Mathematical active models of resistance, coil and capacitor in electric circuits are understood. The issues of practice are solved in the lecture.

2. Course Objectives

It's important to analyze mathematically behavior of the electric physical quantity in the junction point of circuits.
It's the objectives to understand electric characteristics of the circuitry and to learn the mathematical analysis.
The objectives of the students in this lesson are to be able to follows: (1) Students learn basic theory of direct current circuit and Kirchhoff's law and theorems such as Thevenin's theorem.
(2) Students can explain phasor display and complex number display of sinusoidal alternating current.
(3) Students can calculate the impedance of the AC circuit.

3. Grading Policy

Students will be evaluated at 60% regular report and 40% report only if all reports are submitted.
Feedback and added explanations about points to be corrected when returning the report.

4. Textbook and Reference

Textbook
Masaru Nishimaki / Takeaki Mori / Toshihiko Arai   Foundations of Electric Circuits
It is also used for electric circuit 2.

Mori Kita Publication ISBN 978-4-627-73253-7

5. Requirements(Assignments)

Students should write their report tasks by hand.
In the subject acquisition test, only the calculator can be brought in. Also, in the exam, questions similar to the report assignment will be presented.

6. Note

Students should prepare a scientific calculator.

7. Schedule

[1]   Electric circuit current:voltage, electric power, electric energy, circuit element
[2]   Basic characteristics of circuit elements: DC and AC, resistance, inductive / capacitive element
[3]   Basics of DC circuit (1): DC power supply, action of resistance, series connection
[4]   Basics of DC circuit (2):Conductance, parallel connection
[5]   DC circuit network: Y - Δ conversion, bridge circuit
[6]   Basic Theorem of DC Circuit (1): Foundations of Kirchhoff's Law
[7]   Basic Theorem of DC Circuit (2): Superposition
[8]   Various Theorems of DC Circuit (1): Thevenin theorem
[9]   Various Theorems of DC Circuit: (2): Norton's theorem
[10]   Basic Complex Display of AC Circuit Calculation
[11]   Sine wave AC: alternating current, sinusoidal alternating current, rms value
[12]   Phasor display of sine wave AC and complex number display: Phasor display, Phasor diagram
[13]   Circuit elements and fundamental relational expression in AC:
         Resistance, inductance, capacitance
[14]   Impedance of   series circuit
[15]   Impedance of   parallel circuit