

Advanced Circuit Theory

2 units (selection)

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Target Analysis method of nonlinear circuits, and behavior of nonlinear oscillatory circuits and its applications are lectured.

Outline Modeling of nonlinear devices, DC analysis and transient analysis of nonlinear circuits, and steady-state analysis are lectured. Synchronization and chaotic phenomena in nonlinear oscillatory circuits are introduced and their applications to information and communication engineering are discussed. (Style: Lecture)

Style Lecture and exercise

Keyword *nonlinear circuits, circuit analysis, oscillatory circuits*

Fundamental Lecture “[Electrical Circuit Theory \(I\) and Exercise](#)”(0.7), “[Electrical Circuit Theory \(II\) and Exercise](#)”(0.5), “[Network Analysis](#)”(0.3)

Relational Lecture “[Advanced Theory of Complex System Engineering](#)”(0.5)

Requirement Students are required to know how to analyze basic linear circuits.

Notice Course is taught in English.

Goal

1. Understanding of analysis methods of nonlinear circuits.
2. Understanding of behavior of nonlinear circuits and its applications.

Schedule

1. Modeling of nonlinear devices.
2. DC analysis of nonlinear circuits by Newton method.
3. Transient analysis of nonlinear circuits.
4. Steady-state analysis of nonlinear circuits (for 4 lectures).
5. Synchronization phenomena in nonlinear oscillatory circuits (for 2 lectures).
6. Chaotic phenomena in nonlinear oscillatory circuits (for 2 lectures).
7. Engineering applications of nonlinear circuits (for 4 lectures).
8. Conclusions and final examination.

Evaluation Criteria Final examination 80% and exercise 20%.

Textbook None.

Reference

- ◇ Akio Ushida and Mamoru Tanaka, “Nonlinear Circuit Simulations,” Corona Publishing Co.

- ◇ S. Smale and M.W. Hirsch, “Differential Equations, Dynamical Systems, and Linear Algebra,” Academic Press.

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216580>

Student Able to be taken by only specified class(es)

Contact

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MAIL

Note 授業を受ける際には、2時間の授業時間毎に2時間の予習と2時間の復習をしたうえで授業を受けることが、授業の理解と単位取得のために必要である。