
Fundamentals of electronics C

Finalità

The course aims at providing deeper insight of some subjects previously considered in Electronics AB, with the purpose of improving analogue design capability.

Programma

Feedback in electronic circuits.

Use of block diagrams for the representation of linear systems. Negative and positive feedback in amplifiers. Properties of negative feedback. Pointing out feedback in electronic circuits. Operational amplifiers. Stability of feedback amplifiers. Compensation of amplifiers. Non-ideal behavior of operational amplifiers.

Frequency behavior of multistage amplifiers.

Preliminary considerations. Open circuit time constants. Short-circuit time constants

Large signal analysis of output amplifiers.

Conversion efficiency, distortion, power gain. Class A output stages: emitter follower, common emitter. Stress of output devices. Power dissipation in electronic devices. Safe Operating Area. Operation classes: A,B,C and D. Push-pull class B and class AB operation. Class C operation. Class D operation with resonant load and with broadband load (PWM).

An introduction to multi-vibrators and oscillators.

Stability of a rest point. Natural frequencies of a linear circuit. A single rest-point, unstable with sinusoidal startup: examples of circuits suitable for the generation of quasi-sinusoidal signals. A single rest point, unstable with exponential startup: examples of relaxation oscillators. Two stable rest point and an unstable one: examples of bi-stable multi-vibrators. Examples of mono-stable multi-vibrators. Transient analysis with the controlled switch model.

Attività d'esercitazione

Simple exercises are solved during the lectures. Homework.

Modalità d'esame

Oral discussion

Propedeuticità

Electronics AB

Testi consigliati

Lecture notes

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