
Basics of Electronics B

Finalità

Providing the students with basic knowledge of electronic analog circuits, with specific focus on linear amplifiers

Programma

Analog and digital signals. Linearity and linearization. Small-signal equivalent circuits: p-n diode, common-emitter npn BJT, saturated n-channel MOSFET. Linear amplifiers: voltage and current gain, input and output impedance. Miller effect. Common emitter amplifier: polarization; small-signal analysis; maximum efficiency under class A operation; hints to class AB, B, and C operations. High-frequency operation of the common-emitter amplifier. Common-collector amplifier. Common-base amplifier. Common-source amplifier. Multi-stage amplifiers. Cascode amplifier. Darlington connection. Current mirrors. Active loads. BJT and MOSFET differential amplifiers. Feedback: effects of negative feedback on first-order systems; Common emitter amplifier with feedback. Stability of systems with a feedback loop. Ideal operational amplifiers and their applications. Hints to the non-idealities of operational amplifiers.

Modalità d'esame

The test is made of a written test and an oral test. Students must pass the written test to be admitted to the oral test.

Propedeuticità

Analisi matematica (ABC). Fisica generale (ABC). Elettrotecnica AB. Fondamenti di Elettronica A.

Testi consigliati

- R. Menozzi, "Appunti di elettronica: dispositivi ed elettronica analogica lineare", 2nd ed., Pitagora Editrice Bologna, 2006, ISBN 88-371-1624-1.
- P.R. Gray, R.G. Meyer, "Circuiti integrati analogici", 2nd ed., McGraw-Hill, 1994, ISBN 88-386-0702-8.
- P. Cova, "Elettronica analogica - 60 semplici esercizi svolti", Santa Croce, 2003.