
Basics of Electronics B

Finalità

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

Programma

- 1) Linearization and small-signal models – Linearity and distortion; linearization; small-signal model of the p-n diode; small-signal model of the common-emitter BJT; small-signal model of the common-source MOSFET.
- 2) Single-transistor amplifiers at low frequency – Network functions; common-emitter amplifier; common-collector amplifier; common-base amplifier.
- 3) Frequency-domain analysis of the common-emitter amplifier – Short-circuit current gain; open-circuit voltage gain; capacitive coupling.
- 4) Two-transistor amplifiers – Common collector – common emitter amplifier; common collector – common collector amplifier; Darlington amplifier; Cascode amplifier.
- 5) The differential amplifier – Ideal differential amplifier in bipolar technology; offset voltage; common-mode rejection ratio.
- 6) Ideal operational amplifiers – Feedback; stability of circuits with feedback; circuits with operational amplifiers.
- 7) Current sources and active loads – Current mirror in bipolar technology; Widlar current source; Cascode current source; Wilson current source; common-emitter amplifier with active load; differential amplifier with active load.

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,” Pitagora
P. R. Gray, R. G. Meyer, “Analog Integrated Circuits,” Mc Graw Hill