



METADATA

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Abstract

The book includes 18 laboratory exercises on electronics that combine basic analysis, spice simulation, circuit prototyping and measurements. The topics follow a holistic approach combining the basic concepts of analogue and digital electronics while developing basic simulation and prototyping skills. The topics include introduction to spice simulation, circuit prototyping, passive device testing, electronic system analysis and the graphical load line method. They also include exercises focusing on diode circuits, bipolar transistor polarisation and amplifiers, metal-oxide-semiconductor field-effect transistor (MOSFET) circuits and amplifiers and linear operational amplifier circuits. An exercise on digital gates implementation and

the complementary metal-oxide-semiconductor (CMOS) technology is also included. Finally, laboratory exercises on some more advanced circuits, namely comparators, a relaxation oscillator, a digital timer and an amplitude modulator are presented. The final exercise is focused on soldering techniques and circuit board prototyping. Five appendixes are also included, providing general prototyping instructions, integrated circuit handling, supporting simulation examples in great detail, a custom spice model library and a glossary with terms on electronics. The objective of the book is to stimulate interest and provide the basic required skills to first-year engineering students for electronic device prototyping, analysis and testing.

