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## DESIGN WITH OPERATIONAL AMPLIFIERS AND ANALOG INTEGRATED CIRCUITS – 4<sup>TH</sup> EDITION

**Sergio Franco**  
San Francisco State University

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### Overview

Sergio Franco's fourth edition of *Design with Operational Amplifiers and Analog Integrated Circuits* combines theory with real-life applications to deliver a straightforward look at analog design principles and techniques. An emphasis on the physical picture helps the reader develop the intuition and practical insight that are the keys to making sound design decisions. As readers have come to expect, the writing is both plainspoken and helpfully descriptive.

The book is intended for design-oriented courses in applications with operational amplifiers and analog integrated circuits. It also serves as a comprehensive reference for the practicing engineer.

### New to the Fourth Edition

- **A complete revision of negative feedback.** While previous editions of the book addressed feedback from the specialized viewpoint of the op amp user, the fourth edition offers a much broader perspective that will prove useful in other areas like switching regulators and phase-locked loops. The presentation covers both two-port analysis and return-ratio analysis, emphasizing both similarities and differences, in an attempt to dispel persisting confusion between the two (to keep the

distinction, the loop gain and the feedback factor are denoted as  $L$  and  $b$  in two-port analysis, and as  $T$  and  $\beta$  in return-ratio analysis).

- ***Enhanced treatment of op amp dynamics and frequency compensation.*** The feedback revision is accompanied by an extensive rewriting of op amp dynamics and frequency compensation. In this connection, the new edition makes generous use of the voltage/current injection techniques pioneered by R. D. Middlebrook for loop-gain measurements.
- ***Expanded coverage of switching regulators.*** Due to the importance of portable-power management in today's analog electronics, the fourth edition provides expanded coverage of switching regulators. Greater attention is devoted to current control and slope compensation, along with stability issues such as the effect of the right half-plane zero and error-amplifier design.
- ***A more balanced presentation of bipolar and CMOS technologies.***
- ***Substantial increase of in-text PSpice usage.*** The author uses schematic capture (instead of the netlists of the previous editions) to verify calculations and to investigate higher-order effects that would be too complex for paper and pencil analysis.
- ***Redesigned examples and new end-of-chapter problems.*** Numerous thoroughly redesigned examples and 25 percent new end-of-chapter problems reflect the many revisions in this edition of the book. As in previous editions, the carefully thought-out examples and problems are designed to emphasize intuition, physical insight, and problem-solving methodologies of the type engineers exercise daily on the job. .

## Website

The book is accompanied by a Website (<http://www.mhhe.com/franco>) containing information about the book and a collection of useful resources for the instructor. Among the Instructor Resources are a Solutions Manual, a set of PowerPoint Lecture Slides, and a link to the Errata. (Please *do not* contact the Author for access to the Solutions Manual; permission is granted solely by the Publisher; please contact McGraw-Hill's sales representative.)

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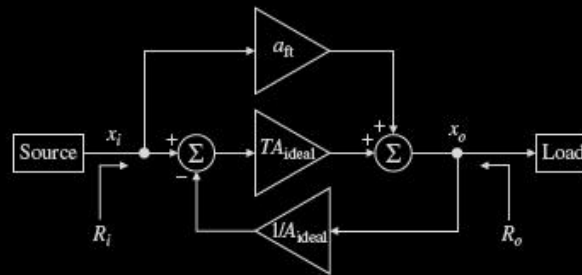
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Fourth Edition

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