

**New!**

# Analysis of Bipolar and CMOS Amplifiers

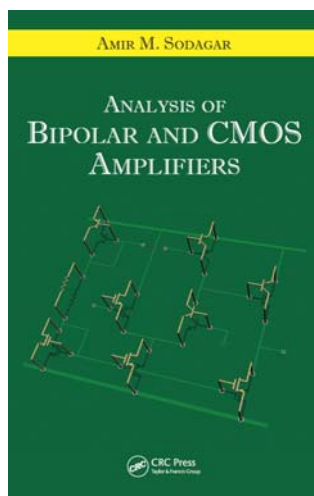
Amir M. Sodagar



**Analysis by Inspection: Analyze Intuitively, Save Time, Help Avoid Errors**

Several invaluable reference books have been published, which generally introduce the basics of analog circuit analysis and design, and specifically apply these concepts to amplifiers. These books usually describe the classic approach to evaluating small-signal amplifiers, which is based on solving circuit equations and precise calculations of the quantities of desired parameters. This technique involves a tedious and sometimes difficult process, especially when the number of components increases.

Differently from the available voluminous wide-scope reference books, **Analysis of Bipolar and CMOS Amplifiers** is mainly focused on the introduction of an intuitive and much simpler technique, known as “analysis by inspection,” for bipolar and CMOS small-signal amplifiers. This allows a straightforward approach to analyzing a wide variety of small-signal analog circuits quickly, yet within an acceptable accuracy range while still based upon scientific fundamentals.



## HIGHLIGHTS:

- Introduces the analysis-by-inspection method at midband frequencies
- Introduces by-inspection analysis methods to determine the amplifier's transfer function and response for high and low frequencies in both time and frequency domains
- Balances coverage of bipolar and CMOS circuits, resulting in an in-depth comparative analysis
- Includes simulation examples at the end of each chapter to help better understand some of the concepts discussed in the chapter

## Ordering Locations

### In the Americas:

#### CRC PRESS

PO Box 409267  
Atlanta, GA 30384-9267  
Tel: 1-800-272-7737  
Fax: 1-800-374-3401

From Outside the Continental U.S.

Tel: 1-561-994-0555  
Fax: 1-561-361-6018

e-mail: [orders@taylorandfrancis.com](mailto:orders@taylorandfrancis.com)

### Rest of the World:

#### CRC PRESS / ITPS

Cheriton House, North Way  
Andover, Hants, SP10 5BE, UK  
Tel (UK): +44 (0) 1264 34 2926  
Tel (Int'l): +44 (0) 1264 34 3070  
Fax: +44 (0) 1264 34 3005

e-mail:

(UK): [uk.tandf@thomsonpublishingservices.co.uk](mailto:uk.tandf@thomsonpublishingservices.co.uk)

(Int'l): [international.tandf@thomsonpublishingservices.co.uk](mailto:international.tandf@thomsonpublishingservices.co.uk)

or Online at:

[http://www.crcpress.com/shopping\\_cart/products/product\\_detail.asp?sku=46446](http://www.crcpress.com/shopping_cart/products/product_detail.asp?sku=46446)

## CONTENTS

### BASICS OF AMPLIFIERS

Introduction  
Basic Concepts  
A Signal and Its DC and AC Components  
Cascaded Amplifiers  
Small-Signal and Large-Signal Amplifiers  
Basic Types of Amplifiers  
A Fundamental Question  
Simulation Examples  
Problems

### TRANSISTORS

Introduction  
Basic Concepts  
MOS Transistor  
Bipolar Transistor  
Simulation Examples  
Problems

### BIASING

Introduction  
Biasing Bipolar Transistors  
Voltage-Divider Biasing  
Biasing PNP Transistors  
Biasing MOS Transistors  
Simulation Examples  
Problems

### SINGLE-STAGE AMPLIFIERS

Introduction  
The Transistor as an Amplifier  
Two-Step Analysis of a Small-Signal Amplifier  
Coupling the Input/Output Signal to/from an Amplifier  
Basic Single-Stage Amplifier Configurations  
Analysis by Inspection  
Other Basic Types of Amplifiers  
Bipolar Amplifiers  
An Important Note  
Simulation Examples  
Problems

### MULTISTAGE AMPLIFIERS

Introduction  
Biasing/Coupling  
AC Analysis

Useful Compound Configurations  
Simulation Examples  
Problems

### CURRENT SOURCES/ MIRRORS

Introduction  
Simple Current Source/Mirror  
Cascode Current Source/Mirror  
Current Scaling  
Multi-Output Current Sources/Mirrors  
Bipolar Current Sources/Mirrors  
Current Sources for Biasing and as Active Loads

Simulation Examples

Problems

### ANALYSIS OF AMPLIFIERS AT LOW FREQUENCIES

Introduction  
Basic Concepts in Frequency Domain  
Plotting an Amplifier's Response at Low Frequencies  
Low-Frequency Analysis by AC Analysis Methods  
Low-Frequency Analysis by Inspection  
Time Response  
More Than One External Capacitor  
Simulation Examples  
Problems

### ANALYSIS OF AMPLIFIERS AT HIGH FREQUENCIES

Introduction  
Basic Concepts at High Frequencies  
Amplifiers at High Frequencies  
Plotting an Amplifier's Response at High Frequencies  
High-Frequency Analysis  
Time Response  
High Cut-Off Frequency  
Complete Response over the Entire Frequency Range  
Case Studies for High-Frequency Analysis of Multi-Stage Amplifiers  
Simulation Examples  
Problems

### REFERENCES

### INDEX

Catalog no. 46446, July 2007, 411 pp., Hardcover  
ISBN: 978-1-4200-4644-1, \$109.95

 **CRC Press**  
Taylor & Francis Group