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# Applied Op Amp Circuits

Analysis and Design with NI® Multisim™

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*In loving memory of my father Moloud Asadi  
and my mother Khorshid Tahmasebi, always  
on my mind, forever in my heart.*

# Preface

An operational amplifier (Op Amp) is a DC-coupled high-gain electronic voltage amplifier with a differential input and, usually, a single-ended output. Op Amps are small in size, cheap, easy to replace and highly reliable. These advantages make the Op Amps one of the important building blocks of modern analog electronics.

This book focuses on the important applications of Op Amps. It has been written for students of electrical and computer engineering and anyone who is interested in Op Amps. The prerequisite for this book is a first course in electric circuits.

This book is composed of 13 chapters. Here is a brief summary of each chapters:

Chapter 1 is an introduction to Op Amps.

Chapter 2 studies the inverting, non-inverting and logarithmic amplifiers.

Chapter 3 studies the difference and instrumentations amplifiers.

Chapter 4 studies the frequency response of Op Amp-based amplifiers.

Chapter 5 studies the input/output impedance of Op Amp-based amplifiers.

Chapter 6 studies the Op Amp-based buffer circuit.

Chapter 7 studies the Op Amp-based comparators.

Chapter 8 studies the Op Amp-based filters.

Chapter 9 studies the Op Amp-based oscillators.

Chapter 10 studies the Op Amp-based precision rectifiers.

Chapter 11 studies the Op Amp-based voltage regulators.

Chapter 12 shows how to design a circuit with NI Multisim's Circuit Wizard.

Chapter 13 studies the Monte Carlo and worst case analysis of Op Amp-based circuits.

I hope that this book will be useful to the readers, and I welcome comments on the book.

Istanbul, Türkiye

Farzin Asadi

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