

PREFACE

This textbook is a reference and tutorial on the design of integrated voltage references. The intent and focus of this book is to present a complete document that covers the conceptual history and the plethora of practical design issues behind integrated voltage references. The target audience is the circuit design community, from the novice digital and analog designer to the more experienced engineer.

Voltage references have always been an essential component of any system and consequently an important topic to explore. The last decades thrust toward higher and even total system integration has required all designers to be knowledgeable of this particular topic due to its mixed-signal implications (i.e., interface requirements and parametric considerations such as loading, output impedance, temperature coefficient, etc.) Bipolar, CMOS, and biCMOS designs and their pertinent issues are therefore discussed. As a result of the emergence of the portable battery-operated environment, low voltage and low power are key characteristics and consequently also included in the discussions.

The whole subject matter is divided into five chapters: *The Basics*, *Current References*, *Voltage References*, *Designing Precision Reference Circuits*, and *Considering the System and the Working Environment*. In the first chapter, the basic principles and components of reference circuits are defined and introduced. The following chapter deals with

