

# PREFACE

The objective of this book is to provide an introduction to code division multiple-access (CDMA) communications. Our motivation for emphasizing CDMA communication is a result of the technological developments that have occurred during the past decade. We are currently witnessing an explosive growth in wireless communication and cellular mobile radio systems, which are based on different multiple-access techniques. We anticipate that, in the near future, we will see a replacement of the current time- and frequency division methods in wireless communication and mobile radio by CDMA.

This textbook originates as an adaptation for undergraduate study of the well-known book *CDMA, Principles of Spread Spectrum Communication* by A.J. Viterbi and is based on courses which I taught several years at Lund University in Sweden. The reader can see an indubitable influence of Viterbi's book on the content of this book. In particular, our treatment of direct-sequence CDMA follows the ideas and methods of Viterbi's book, but for completeness we also include in the book a consideration of frequency hopping CDMA and pulse position hopping ("time hopping") CDMA. We have studied also in more detail forward transmission in the direct-sequence CDMA system. Furthermore, we consider it necessary to include in our textbook information-theoretical analysis of CDMA communication.

My understanding of the field, and hence the content of this text, has been influenced by a number of books on the topic of digital and spread spectrum communications. In addition to the pioneering book by Viterbi I have to mention *Digital Communication* by J.G. Proakis and *Introduction to Spread Spectrum Communication* by R.L. Peterson, R.E. Ziemer, and D.E. Borth. Readers familiar

