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William T. Vetterling, Saul A. Teukolsky, William H. Press and Brian P. Flannery
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Preface

This *Numerical Recipes Example Book (FORTRAN)* is designed to accompany the text and reference book *Numerical Recipes in FORTRAN: The Art of Scientific Computing*, Second Edition, by William H. Press, Saul A. Teukolsky, William T. Vetterling, and Brian P. Flannery (Cambridge University Press, 1992). In that volume, the algorithms and methods of scientific computation are developed in considerable detail, starting with basic mathematical analysis and working through to actual implementation in the form of **FORTRAN** subroutines. The routines in *Numerical Recipes in FORTRAN: The Art of Scientific Computing*, numbering more than 300, are meant to be incorporated into user applications; they are subroutines (or functions), not stand-alone programs.

It often happens, when you want to incorporate somebody else's procedure into your own application program, that you first want to see the procedure demonstrated on a simple example. Prose descriptions of how to use a procedure (even those in *Numerical Recipes*) can occasionally be inexact. There is no substitute for an actual, **FORTRAN** demonstration program that shows exactly how data are fed to a procedure, how the procedure is called, and how its results are unloaded and interpreted.

Another not unusual case occurs when you have, for one seemingly good purpose or another, modified the source code in a "foreign" procedure. In such circumstances, you might well want to test the modified procedure on an example known previously to have worked correctly, *before* letting it loose on your own data. There is the related case where procedure source code may have become corrupted, e.g., lost some lines or characters in transmission from one machine to another, and a simple revalidation test is desirable.

These are the needs addressed by this *Numerical Recipes Example Book*. Divided into chapters identically with *Numerical Recipes in FORTRAN: The Art of Scientific Computing*, this book contains **FORTRAN** source programs that exercise and demonstrate all of the *Numerical Recipes* subroutines and functions. The programs are commented, and each is also prefaced by a short description of what it does, and of which *Numerical Recipes* routines it exercises. In many cases where the demonstration programs require input data, that data is also printed in this book. In some cases, where the demonstration programs are not "self-validating," sample output is also shown.

Necessarily, in the interests of clarity, the *Numerical Recipes* procedures and functions are demonstrated in simple ways. A consequence is that the demonstration programs in this book do not usually test all possible regimes of input data, or even all lines of procedure source code. The demonstration programs in this book were by no means the only validating tests that the *Numerical Recipes* procedures and functions

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were required to pass during their development. The programs in this book *were* used during the later stages of the production of *Numerical Recipes in FORTRAN: The Art of Scientific Computing* to maintain integrity of the source code, and in this role were found to be invaluable.

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