

- Preface p. xxi
- 1 Preliminaries p. 1
- 1 Introduction p. 3
- General Goals of VBI Applications p. 5
- Organization of the Book p. 6
- Contents of the CD-ROMs p. 10
- 2 Basic Concepts p. 11
- Data Acquisition (DAQ) Basics p. 12
- LabVIEW Basics p. 14
- BioBench Basics p. 16
- Independent Solution Articles
- 2 Research Applications p. 27
- 3 Biopotentials p. 29
- Typical Laboratory Workstation p. 30
- Generic Instrumentation/Data Acquisition Issues p. 33
- Electroneurology p. 36
- Neuromuscular Electrophysiology (Electromyography) p. 58
- Cardiac Electrophysiology (Electrocardiography) p. 75
- Independent Solution Articles
- 4 Cardiopulmonary Dynamics p. 93
- Typical Laboratory Workstation p. 94
- Generic Instrumentation/Data Acquisition Issues p. 95
- Pulmonary Function p. 97
- Lung Tissue Viscoelastance p. 107
- Cardiovascular Hemodynamics p. 110
- A Cardiovascular Pressure-Dimension Analysis System p. 118
- Independent Solution Articles
- 3 Clinical Applications p. 137
- 5 Cardiopulmonary Applications p. 139
- The Cardiopulmonary Measurement System (CMS) p. 140
- Validation of a LabVIEW-based Vibrotactile Stimulation System to Treat Apnea of Prematurity p. 163
- IntelliVent Data Logger: A Real-time Research Tool for Data Acquisition, Analysis, and Display of Ventilatory Parameters p. 170
- Independent Solution Articles
- 6 Machine Vision and Motion Control Applications p. 187
- Overview p. 188
- Machine Vision Defined p. 189
- Computer Technologies for Machine Vision: Making Machine Vision Easier p. 206
- Cameras and Interfacing p. 214
- Motion Systems p. 219
- A LabVIEW-Based Wound Management System p. 230
- Independent Solution Articles
- 4 Medical Device Development Applications p. 257
- 7 Medical Device Testing p. 259

- The EndoTester--A Virtual Instrument-Based Quality Control and Technology Assessment System for Surgical Video Systems p. 260
- FluidSense Innovative IV Pump Testing p. 274
- Independent Solution Articles
- 8 LabVIEW in a Regulated Environment p. 295
- Key Characteristics and Terminology p. 297
- Development Architecture p. 301
- The Development Process p. 306
- Automation Tools p. 311
- Verification and Validation Test p. 323
- Documenting the Project p. 332
- Verification after Release--Controlling and Maintaining the Software p. 337
- Summary p. 338
- Independent Solution Articles
- 5 Healthcare Information Management Systems p. 343
- 9 Medical Informatics p. 345
- Defining Medical Informatics p. 347
- Computers in Medicine p. 348
- Electronic Medical Record p. 352
- Computerized Physician Order Entry p. 353
- Decision Support p. 354
- Information Retrieval p. 355
- Medical Imaging p. 356
- Patient Monitoring p. 358
- Medical Education p. 360
- Medical Simulation p. 361
- Managing Disparate Information p. 363
- Integrated Dashboards p. 366
- Independent Solution Articles
- 10 Executive Dashboards p. 373
- Overview p. 374
- The Need for Real-time Performance Measurement p. 374
- Data Management p. 375
- PIVIT--Performance Indicator Virtual Instrument Toolkit p. 381
- Executive Information Dashboard p. 399
- The Bed Management/Census Control Dashboard p. 400
- Summary p. 414
- Independent Solution Articles
- 6 Advanced Topics p. 437
- 11 Mathematical Modeling/Simulation of Physiologic Systems p. 439
- Cardiovascular System Modeling and Simulation p. 442
- Pulmonary Mechanics Modeling and Simulation p. 457
- Integrated Cardiopulmonary Dynamics Modeling and Simulation p. 475
- 12 Virtual Bio-Instrumentation, LabVIEW, and the Internet p. 489
- Access to Biomedical Virtual Instruments Anywhere p. 490
- Internet Technologies and Virtual Instrumentation p. 492

- Choosing a Technical Solution with LabVIEW p. 494
- The VI Server: Remotely Manipulating VIs p. 502
- DataSocket p. 506
- The LabVIEW Web Server p. 510
- Controlling VIs Over the Web p. 513
- Designing VBI for Remote Network Access p. 529
- 13 Future Potential p. 535
- Independent Solution Article
- Appendix Typical Math Model Parameter Values p. 543
- Index p. 549
- About the Authors p. 569