

## 图书基本信息

书名：《Cardiovascular and Respiratory Systems心血管和呼吸系统的建模，分析和控制》

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## 内容概要

The human cardiovascular and respiratory control systems represent an important focal point for developing physiological control theory because of the complexity of the control mechanisms involved, the interaction between cardiovascular and respiratory function, and the importance of this interaction in many clinical situations. This volume brings together the range of control processes involved in the effective regulation of these systems and develops modeling themes, strategies, and key clinical applications using contemporary mathematical and control methodologies. The reader will gain an appreciation of how analytical techniques and ideas from optimal control theory, systems theory, and numerical analysis can be utilized to better understand the regulation processes in human cardiovascular and respiratory systems. **Cardiovascular and Respiratory Systems: Modeling, Analysis, and Control** uses a principle-based modeling approach and analysis of feedback control regulation to elucidate the physiological relationships. Models are arranged around specific questions or conditions, such as exercise or sleep transition, and are generally based on physiological mechanisms rather than on formal descriptions of input-output behavior. The authors ask open questions relevant to medical and clinical applications and clarify underlying themes of physiological control organization. Current problems, key issues, developing trends, and unresolved questions are highlighted. Researchers and graduate students in mathematical biology and biomedical engineering will find this book useful. It will also appeal to researchers in the physiological and life sciences who are interested in mathematical modeling. **List of Symbols and Abbreviations; Preface; Chapter 1: The Cardiovascular System under an Ergometric Workload; Chapter 2: Respiratory Modeling; Chapter 3: Cardiorespiratory Modeling; Chapter 4: Blood Volume and the Venous System; Chapter 5: Future Directions; Appendix A.**

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## 书籍目录

List of Symbols and Abbreviations Preface

1 The Cardiovascular System under an Ergometric Workload 1.1 Some Physiological Facts 1.2 The Basic Model 1.3 Analysis of the Basic Model 1.3.1 Existence of equilibria 1.3.2 An invariance property of Grodins' system 1.4 The Linear-Quadratic Regulator Problem 1.5 The Bicycle Ergometer Test 1.6 Parameter Identification 1.6.1 A priori determined parameters 1.6.2 The output least-squares formulation of the parameter identification problem 1.7 Numerical Results 1.7.1 Parameter identification 1.7.2 Gradient computations 1.7.3 Sensitivity analysis

2 Respiratory Modeling 2.1 Respiratory Control Physiology 2.1.1 General features of respiration 2.1.2 The chemical control system for ventilation 2.1.3 Structural features of ventilation 2.1.4 Blood gas transport 2.1.5 Respiratory control stresses and problems 2.1.6 Approaches to modeling respiratory control 2.2 Respiratory Control Model 2.2.1 The lung compartment 2.2.2 The tissue compartment 2.2.3 The brain compartment 2.2.4 Dissociation relations 2.2.5 State delays 2.2.6 Empirical control equation 2.2.7 Minute ventilation and tidal volume 2.2.8 Cardiac output and CBF 2.3 Stability of Respiratory Control 2.3.1 Computation of the delays 2.3.2 Stability and delays 2.4 Modeling Applications 2.4.1 Sleep and PB 2.4.2 PB and high altitude 2.4.3 Respiratory complications of HF 2.4.4 Other modeling issues

3 Cardiorespiratory Modeling 3.1 Physiology Introduction 3.1.1 Global control of the CVS 3.1.2 Local control of the CVS and autorregulation 3.1.3 Blood volume shift 3.1.4 Interaction of CVS and RS control 3.2 The Combined Model 3.2.1 Model equations 3.2.2 State dependency of the delays 3.2.3 Control formulation 3.2.4 Steady-state relations 3.3 Modeling Applications 3.3.1 CHF 3.3.2 Orthostatic and k B NP stress 3.3.3 Blood volume control and hemorrhage 3.3.4 CBF and OI

4 Blood Volume and the Venous System 4.1 Introduction 4.2 Scaling 4.2.1 Isometric relationships 4.2.2 Allometric relationships 4.2.3 Cardiovascular entities 4.3 The Venous System 4.4 Capacitance 4.4.1 Passive mechanisms 4.4.2 Active mechanisms 4.4.3 Flow effects 4.4.4 Modeling and measurement 4.4.5 System of compliances 4.4.6 Mean circulatory filling pressure 4.4.7 Parallel arrangement 4.5 Blood Volume .....5 Future Directions

A Supplemental Calculations B A Nonlinear Feedback Law C Retarded Functional Differential Equations: Basic Theory Bibliography Index

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