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Nota di contenuto	Dynamics of the Vascular System; Contents; Preface; 1. Historical Backgrounds and Book Contents; 1.1 Discoveries of the Circulation; 1.2 Importance of the Vascular System; 1.3 Modern Concepts; 1.4 Book Contents; 2. Vascular Biology, Structure and Function; 2.1 Anatomical Organization of the Vasculature; 2.2 Mechanical Properties of Blood Vessels; 2.3 Functional Properties of Blood; 2.4 Control Aspects of the Vascular System; 3. Physical Concepts and Basic Fluid Mechanics; 3.1 Basic Mechanics and Dimensional Analysis; 3.2 Frequency Domain and Fourier Analysis; 3.3 Fluid Mechanics and Rheology 4. Hemodynamics of Large Arteries 4.1 Ventricular Outflow and the Aorta; 4.2 Pressure-Flow Relations and Vascular Impedance; 4.3 Wave Propagation Phenomena; 4.4 Wave Reflection Phenomena; 4.5 Modeling Aspects of the Arterial System; 5. Vascular Branching; 5.1 Branching Geometry; 5.2 Fluid Mechanics of Vascular Branching; 5.3 Pulse Transmission Characteristics at Vascular Branching; 5.4 Optimization Aspects Applicable to Vascular Branching; 6. The Venous System; 6.1 The Reservoir Properties and Venous Return; 6.2 Pressure and Flow Waveforms in Veins 6.3 Modeling and Collapsible Vessel Properties 7. The Microcirculation;

7.1 Structure of the Microcirculation; 7.2. Pressure-Flow Relation and Microcirculatory Mechanics; 7.3. Pulse Transmission and Modeling Aspects; 8. Hemodynamic Measurements and Dynamics of the Assisted Circulation; 8.1 Pressure, Flow and Dimension Measurements; 8.2 The Assisted Circulation and the Intra-Aortic Balloon Pump; Bibliography; Index

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## Sommario/riassunto

This book begins with the historical discoveries of the features of the vascular system and its importance in the overall circulatory function. Modern aspects of vascular biology in terms of structure and function are then described, followed by the introduction of physical principles and basic fluid mechanics for quantitative analysis. The hemodynamics of large arteries, the optimal structure of vascular branching and the pulsatile energy transmission and modeling aspects are elaborated. These are extended to analyze the function of the venous system and the microcirculation. Finally, the integrated

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