Table of Contents

Acknowle	edgments
Chapter 2	I. Introduction
1.1	Motivation7
1.2	Structure of the tutorial
1.3	Indications for the reader
Chapter 2	2. Mathematical Notions 10
2.1	Polynomial 10
2.2	Exponentials
2.3	Equations 10
2.4	Matrices 12
2.5	Derivatives and Integrals
2.6	Differential Equations and Laplace Transforms
Chapter	3. Getting Started with MATLAB 22
3.1	Introduction
3.2	Matrices in MATLAB 22
3.3	MATLAB Plotting
3.4	SIMULINK
3.4 3.5	SIMULINK
3.4 3.5 Chapter	SIMULINK
3.4 3.5 Chapter - 4.1	SIMULINK
3.4 3.5 Chapter - 4.1 4.2	SIMULINK
3.4 3.5 Chapter - 4.1 4.2 4.3	SIMULINK
3.4 3.5 Chapter 4.1 4.2 4.3 4.4	SIMULINK

4.6	Implementing the Model 4	0
4.7	Performing Parameters Estimation4	1
4.8	Performing Sensitivity Analysis 4	5
4.9	Validating the Model and Optimal Experimental Design4	9
Chapter	5. Case Study – Pharmacokinetics Modeling5	3
5.1	Pharmacokinetics Model of Protamine5	3
5.2	Pharmacokinetics Model of Digoxin5	6
5.3	Pharmacokinetics Model of Vancomycin6	52
5.4	Physiologically-Based Pharmacokinetic Model of Liver	0
5.5	Pharmacokinetics Model with 5 compartments9	0
5.6	Miscellaneous Models9	15
Chapter	6. Case Study – Cardiovascular Modeling9	18
6.1	Cardiovascular Mechanical Model9	8
6.2	Model of Baroreflex)4
63	Model of Neuron Action Potential	0
0.0		כו
6.4	Simulation of the Electrocardiogram	.2
6.4 6.5	Simulation of the Electrocardiogram	.2 .6
6.4 6.5 6.6	Simulation of the Electrocardiogram	.2 .6
6.4 6.5 6.6 Chapter	Simulation of the Electrocardiogram	.6 !1
6.4 6.5 6.6 Chapter 7.1	Simulation of the Electrocardiogram	.6 !1 !7
6.4 6.5 6.6 Chapter 7.1 7.2	Simulation of the Electrocardiogram	.6 !1 !7 !8
6.4 6.5 6.6 Chapter 7.1 7.2 7.3	Simulation of the Electrocardiogram	2 26 21 27 27 27 28
6.4 6.5 6.6 Chapter 7.1 7.2 7.3 7.4	Simulation of the Electrocardiogram	12 16 17 17 17 18 19
6.4 6.5 6.6 Chapter 7.1 7.2 7.3 7.4 7.5	Simulation of the Electrocardiogram	12 16 17 17 17 18 19 11 13
6.4 6.5 6.6 Chapter 7.1 7.2 7.3 7.4 7.5 7.6	Simulation of the Electrocardiogram	12 16 17 17 17 17 17 17 18 19 11 13 15

Table of Figures......141