

# Contents

<b>1</b>	<b>Introduction</b>	1
<b>2</b>	<b>Basic Theory</b>	11
2.1	Impulsive Differential Equations	11
2.2	Almost Periodic Sequences and Almost Periodic Functions	19
2.2.1	Almost Periodic Sequences	19
2.2.2	Almost Periodic Functions	23
2.3	Stability and Boundedness Definitions	26
2.4	Piecewise Continuous Lyapunov Functions and Lyapunov Functionals	30
2.5	Impulsive Differential Inequalities	34
2.6	Coincidence Degree Lemmas	39
<b>3</b>	<b>Impulsive Biological Models</b>	41
3.1	An Impulsive Lasota–Ważewska Model	41
3.2	An Impulsive Model of Hematopoiesis	47
3.3	A More General $n$ -Dimensional Impulsive Biological Model	52
3.4	Linear and Quasilinear Impulsive Models	61
3.5	Forced Perturbed Impulsive Models	94
3.6	Perturbations in the Linear Part	102
3.7	An Impulsive Delay Logarithmic Population Model	109
<b>4</b>	<b>Impulsive Models in Population Dynamics</b>	113
4.1	Single-Species Population Models	114
4.2	An Impulsive Two-Species Model	118
4.3	Impulsive Models in Banach Space	123
4.4	Impulsive $n$ -Species Lotka–Volterra Models	131
4.5	Impulsive Lotka–Volterra Models with Dispersions	141
4.6	Impulsive $n$ -Species Lotka–Volterra Models with Finite Delays	147
4.6.1	The Periodic Case	149
4.6.2	The Non-periodic Case	160
4.7	Impulsive $n$ -Species Lotka–Volterra Cooperation Models	174

- 4.8 Impulsive n-Species Lotka–Volterra Models with Infinite Delays.... 178
- 4.9 Impulsive Kolmogorov-Type Delayed Models ..... 195
- 5 Impulsive Neural Networks ..... 207**
  - 5.1 Impulsive Hopfield Neural Networks ..... 208
  - 5.2 Impulsive Neural Network Models with Finite Delays ..... 216
  - 5.3 Impulsive BAM Neural Network Models..... 237
  - 5.4 Impulsive Neural Network Models with Infinite Delays ..... 254
  - 5.5 Impulsive Neural Network Models of General Type ..... 256
- 6 Impulsive Models in Economics ..... 271**
  - 6.1 Impulsive Solow-Type Models with Endogenous Delays..... 271
    - 6.1.1 Stability of the Impulsive Control Model..... 277
    - 6.1.2 Impulsive Stabilization of the Solutions ..... 282
    - 6.1.3 Solow–Swan Models Accounting for Depreciation..... 285
  - 6.2 Impulsive Price Fluctuations Models ..... 287
- References ..... 299**
- Index ..... 315**



<http://www.springer.com/978-3-319-28060-8>

Applied Impulsive Mathematical Models

Stamova, I.; Stamov, G.

2016, XII, 318 p., Hardcover

ISBN: 978-3-319-28060-8