

# Contents

<b>Preface</b>	<b>xi</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Preliminaries, 1	
1.2 Censored Data, 1	
1.3 Scope of the Book, 5 Bibliographical Remarks, 6	
<b>2 Functions of Survival Time</b>	<b>8</b>
2.1 Definitions, 8	
2.2 Relationships of the Survival Functions, 15 Bibliographical Remarks, 17 Exercises, 17	
<b>3 Examples of Survival Data Analysis</b>	<b>19</b>
Example 3.1 Comparison of Two Treatments and Three Diets, 19	
Example 3.2 Comparison of Two Survival Patterns Using Life Tables, 27	
Example 3.3 Fitting Survival Distributions to Remission Data, 29	
Example 3.4 Relative Mortality and Identification of Prognostic Factors, 37	
Example 3.5 Identification of Risk Factors, 45 Bibliographical Remarks, 51 Exercises, 51	
<b>4 Nonparametric Methods of Estimating Survival Functions</b>	<b>66</b>
4.1 Product-Limit Estimates of Survivorship Function, 67	

4.2	Life-Table Analysis, 78	
4.3	Relative, Five-Year, and Corrected Survival Rates, 93	
4.4	Standardized Rates and Ratios, 95	
	Bibliographical Remarks, 100	
	Exercises, 101	
<b>5</b>	<b>Nonparametric Methods for Comparing Survival Distributions</b>	<b>104</b>
5.1	Comparison of Two Survival Distributions, 104	
5.2	The Mantel and Haenszel Test, 117	
5.3	Comparison of $K$ ( $K > 2$ ) Samples, 122	
	Bibliographical Remarks, 128	
	Exercises, 128	
<b>6</b>	<b>Some Well-Known Survival Distributions and Their Applications</b>	<b>131</b>
6.1	The Exponential Distribution, 131	
6.2	The Weibull Distribution, 135	
6.3	The Lognormal Distribution, 141	
6.4	The Gamma Distribution, 146	
6.5	Other Survival Distributions, 151	
	Bibliographical Remarks, 154	
	Exercises, 155	
<b>7</b>	<b>Graphical Methods for Survival Distribution Fitting and Goodness-of-Fit Tests</b>	<b>157</b>
7.1	Introduction, 157	
7.2	Probability Plotting, 159	
7.3	Hazard Plotting, 173	
7.4	Tests of Goodness-of-Fit, 182	
7.5	Computer Programs for the Gamma Probability Plot, 194	
	Bibliographical Remarks, 197	
	Exercises, 197	
<b>8</b>	<b>Analytical Estimation Procedures for Survival Distributions</b>	<b>200</b>
8.1	The Exponential Distribution, 200	
8.2	The Weibull Distribution, 211	
8.3	The Lognormal Distribution, 212	
8.4	The Gamma Distribution, 220	

8.5	A Regression Method for Survival Distribution Fitting, 224 Bibliographical Remarks, 231 Exercises, 231	
<b>9</b>	<b>Parametric Methods for Comparing Two Survival Distributions</b>	<b>233</b>
9.1	Comparison of Two Exponential Distributions, 233	
9.2	Comparison of Two Weibull Distributions, 238	
9.3	Comparison of Two Gamma Distributions, 240 Bibliographical Remarks, 241 Exercises, 241	
<b>10</b>	<b>Identification of Prognostic Factors Related to Survival Time</b>	<b>243</b>
10.1	Preliminary Examination of Data, 243	
10.2	Nonparametric Methods, 245	
10.3	Parametric Regression Methods, 264 Bibliographical Remarks, 279 Exercises, 279	
<b>11</b>	<b>Identification of Risk Factors Related to Dichotomous Data</b>	<b>281</b>
11.1	Univariate Analysis, 282	
11.2	The Linear Discriminant Function, 289	
11.3	The Linear Logistic Regression Method, 298 Bibliographical Remarks, 313 Exercises, 313	
<b>12</b>	<b>Planning and Design of Clinical Trials (I)</b>	<b>315</b>
12.1	History of Clinical Trials, 316	
12.2	Phase I and II Trials, 318	
12.3	Phase III Trials, 321 Bibliographical Remarks, 348 Exercises, 348	
<b>13</b>	<b>Planning and Design of Clinical Trials (II)</b>	<b>350</b>
13.1	Preparation of Protocols, 350	
13.2	Randomization, 353	
13.3	The Use of Prognostic Factors in Clinical Trials, 360	
13.4	Controls in Cancer Clinical Studies, 363	

13.4	Controls in Cancer Clinical Studies, 363	
	Bibliographical Remarks, 372	
	Exercises, 372	
<b>Appendix A</b>	<b>The Newton–Raphson Method</b>	<b>374</b>
<b>Appendix B</b>	<b>Computer Program GAMPLOT</b>	<b>379</b>
<b>Appendix C</b>	<b>Statistical Tables</b>	<b>386</b>
<b>References</b>		<b>453</b>
<b>Index</b>		<b>479</b>