Contents

Preface ix

1 Preliminaries 1
- 1.1 Construction of symmetric multivariate distributions 1
- 1.2 Notation 10
- 1.3 Groups and invariance 14
- 1.4 Dirichlet distribution 16
- Problems 24

2 Spherically and elliptically symmetric distributions 26
- 2.1 Introduction and definition 26
- 2.2 Marginal distributions, moments and density 33
- 2.3 The relationship between ϕ and F 38
- 2.4 Conditional distributions 39
- 2.5 Properties of elliptically symmetric distributions 42
- 2.6 Mixtures of normal distributions 48
- 2.7 Robust statistics and regression model 51
- 2.8 Log-elliptical and additive logistic elliptical distributions 55
- 2.9 Complex elliptically symmetric distributions 64
- Problems 66

3 Some subclasses of elliptical distributions 69
- 3.1 Multiuniform distributions 70
- 3.2 Symmetric Kotz type distributions 76
- 3.3 Symmetric multivariate Pearson Type VII distributions 81
- 3.4 Symmetric multivariate Pearson Type II distributions 89
- 3.5 Some other subclasses of elliptically symmetric distributions 92
- Problems 93

4 Characterizations 96
4.1 Some characterizations of spherical distributions 96
4.2 Characterizations of uniformity 100
4.3 Characterizations of normality 105
Problems 110

5 Multivariate ℓ_1-norm symmetric distributions 112
5.1 Definition of L_n 112
5.2 Some properties of L_n 114
5.3 Extended T_n family 122
5.4 Mixtures of exponential distributions 130
5.5 Independence, robustness and characterizations 134
Problems 139

6 Multivariate Liouville distributions 142
6.1 Definitions and properties 142
6.2 Examples 146
6.3 Marginal distributions 150
6.4 Conditional distribution 157
6.5 Characterizations 162
6.6 Scale-invariant statistics 169
6.7 Survival functions 171
6.8 Inequalities and applications 174
Problems 179

7 α-Symmetric distributions 181
7.1 α-Symmetric distributions 181
7.2 Decomposition of 1-symmetric distributions 185
7.3 Properties of 1-symmetric distributions 191
7.4 Some special cases of $\Psi_n(\alpha)$ 196
Problems 197

References 202

Index 213