

Table of Contents

Table of Contents	v
Abstract	viii
Acknowledgements	x
Introduction	1
1 Preliminary	6
1.1 An Example of Application of Bayesian Method of Testing Many Hypotheses for Solving Real Human Problems	6
1.1.1 Formalization of the problem of sustainable development of pro- duction	7
2 Statement and General Solution of the Bayesian Problem of Testing Many Hypotheses	16
2.1 Statement of the Problem	16
2.2 General solution	18
2.2.1 General loss function	18
2.2.2 Step loss function	19
2.3 Hypotheses Testing Concerning the Vector of Mathematical Expectation of Multivariate Normal Distribution	20
2.3.1 Step loss function	21
2.3.2 General loss function	22
2.3.3 The Number of hypotheses equal to two	25
2.4 Hypotheses Testing Concerning all Parameters of Multidimensional Normal Distribution	26

2.4.1	The Arbitrary number of hypotheses	26
2.4.2	Number of hypotheses equal to two	28
3	Computation of the Risk Function	31
3.1	Computation of the Multivariate Normal Integral over the Region of Complex Configuration	31
3.2	On the Existence and Continuity of Probability Distribution Law of Random Variable (3.7)	47
3.3	Quasi-Optimal Bayesian Procedures of Many Hypotheses Testing . .	50
3.3.1	Bayesian task of hypotheses testing	52
3.3.2	Approximate Computation of Risk Function (2.8)	53
3.3.3	On the Ratios Between Average Risks of Considered Problems	55
3.3.4	Normal Distribution of Observation Results	58
4	Sequential Analysis Approach for Testing Many Hypotheses	60
4.1	Introduction	60
4.2	Conditional Bayesian problem of testing many hypotheses	62
4.3	The method of sequential analysis of Bayesian type	64
4.4	Consistency and uniqueness of sequential analysis method of Bayesian type	66
5	Experimental research	70
5.1	Problems of Sensitivity Analysis	70
5.1.1	Loss Function Choice Problems	71
5.1.2	Sensitivity Analysis	75
5.2	Experimental Research of the developed Bayesian Methods	79
5.3	Experimental Research of Quasi-optimal Bayesian Rule	84
5.4	Experimental Research of Sequential Analysis Method	91
	Conclusion	94
	Bibliography	96
	Appendix A. On the Existence of Closed Form for Probability Distri- bution Law of Weighted Sum of Exponents of Correlated Quadratic Forms.	108

