ISO/TR 13587:2012-07 (E)

Three statistical approaches for the assessment and interpretation of measurement uncertainty

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Symbols (and abbreviated terms) 2

5 The problem addressed 3

6 Statistical approaches 4
6.1 Frequentist approach 4
6.2 Bayesian approach 5
6.3 Fiducial approach 5
6.4 Discussion 6

7 Examples 6
7.1 General 6
7.2 Example 1a 6
7.3 Example 1b 7
7.4 Example 1c 7

8 Frequentist approach to uncertainty evaluation 7
8.1 Basic method 7
8.2 Bootstrap uncertainty intervals 10
8.3 Example 1 13
8.3.1 General 13
8.3.2 Example 1a 14
8.3.3 Example 1b 15
8.3.4 Example 1c 15

9 Bayesian approach for uncertainty evaluation 16
9.1 Basic method 16
9.2 Example 1 18
9.2.1 General 18
9.2.2 Example 1a 18
9.2.3 Example 1b 20
9.2.4 Example 1c 21
9.2.5 Summary of example 21

10 Fiducial inference for uncertainty evaluation 21
10.1 Basic method 21
10.2 Example 1 23
10.2.1 Example 1a 23
10.2.2 Example 1b 25
10.2.3 Example 1c 26

11 Example 2: calibration of a gauge block 26
11.1 General 26
11.2 Frequentist approach 28
11.3 Bayesian approach 30
11.4 Fiducial approach 33

12 Discussion 35
12.1 Comparison of uncertainty evaluations using the three statistical approaches 35
12.2 Relation between the methods proposed in GUM Supplement 1 (GUMS1) and the three statistical approaches 38

13 Summary 40

Bibliography 42