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For Comments Only

Draft Indian Standard

Statistical Analysis for Evaluating the Precision of Binary Measurement Methods and their Results

ICS 03.120.30

NATIONAL FOREWORD

(Formal clauses to be added later on)

The text of the International Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

In this adopted standard, references appear to certain International Standard for which no Indian Standard exists. The technical committee have reviewed the provisions of the following International standards referred in this standard and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 3534-1, Statistics — Vocabulary and symbols — Part 1: General statistical terms and terms used in probability	IS 7920 (Part 1):2012, Statistical - Vocabulary and symbols: Part 1 general statistical terms and terms used in probability (Third Revision)	Identical
ISO 5725-1, Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions	IS 15393 (Part 1):2003/ ISO 5725-1 : 1994, Accuracy (Trueness And Precision) of measurement methods and results: Part 1 general principles and definitions	Identical

Note: The technical content of the document is not available on website. For details, please refer the corresponding ISO/TR 27877: 2021 or kindly contact:

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Scope

This document introduces five statistical methods for evaluating the precision of binary measurement methods and their results. The five methods can be divided into two types. Both types are based on measured values provided by each laboratory participating in a collaborative study. In the first type, each laboratory repeatedly measures a single sample. The samples measured by the laboratories are nominally identical. The second type is an extension of the first type, where there are several levels of samples.

For each statistical method, this document briefly summarizes its theory and explains how to estimate the proposed precision measures. Some real cases are illustrated to help the readers understand the evaluation procedures involved. For the first and second types of methods, five and three cases are presented, respectively.

Finally, this document compares the five statistical methods.

Introduction

The documents in the ISO 5725 series define the precision of quantitative measurement methods and their results, and assume that the errors follow normal distributions in their basic models. Also, they provide how to run experiments to evaluate precision measures, such as repeatability and reproducibility. Nowadays, there is also a demand for dealing with qualitative measurement methods and their results, which output binary data, categorical data, etc. However, the ISO 5725 series is not suitable mathematically for analyzing such data.

Several existing studies propose statistical methods for dealing with binary and/or categorical data, but no guidance documents are available so far. Hence, this document summaries various methods to evaluate the precision of binary measurement methods and their results, which are the most essential and frequently used methods for qualitative data.