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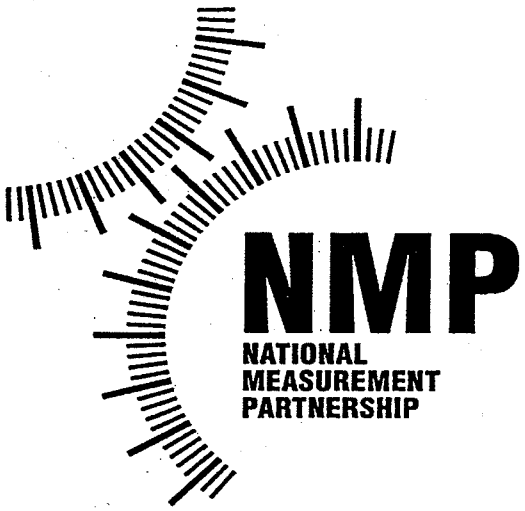

CONFERENCE DIGEST

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A Beginner's Guide to Uncertainty of Measurement

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Abstract

An introductory guide to uncertainty of measurement has been produced, explaining the basic concepts and processes of estimating uncertainty. It is aimed at readers who are new to the subject, intending to give them a basic level of understanding which will enable them to read more advanced texts on the subject.

1. Introduction

A Beginners Guide to Uncertainty of Measurement [1] is one of the series of Measurement Good Practice Guides produced under the Competing Precisely project - a measurement awareness raising campaign which forms part of the National Measurement Partnership Programme. The Programme is managed on behalf of the DTI by the National Physical Laboratory. NPL is the UK's centre for measurement standards, and associated science and technology.

2. Background

Many people are daunted by the subject of measurement uncertainty. It is a subject which is widely misunderstood, from the factory floor to the highest academic circles. It is a complicated subject, and still evolving. So there is a great need for a guide which provides clear, down-to-earth explanations, easy enough for non-expert readers.

3. The Beginner's Guide

The Beginner's Guide is aimed at readers who know little or nothing about uncertainty of measurement, but need to learn about it. It is for technicians and managers in testing and calibration laboratories, technicians and managers in manufacturing, technical salespeople, research scientists, students, teachers, and everyone who has an interest in measurement.

In the development of this Beginner's Guide, care has been taken to make the explanations and examples understandable to anyone who can spare the short time it takes to read it. On most pages, examples are given of uncertainties that we meet in everyday situations. In the first sections of this Beginner's Guide, the concept and importance of measurement uncertainty are introduced. Following this, details are given of how to estimate uncertainties in real measurement situations. The main steps involved in calculating the uncertainty for a measurement are outlined with easy to follow examples. Finally a glossary, some cautionary remarks and list of publications for further reading are given, pointing towards the next steps in understanding and calculating measurement uncertainties.

Table 1, below, shows a listing of the main contents of the Beginner's Guide.

Table 1. A listing of the main contents of A Beginner's Guide to Uncertainty of Measurement

This Beginner's Guide may not fully equip the reader to carry out detailed uncertainty analysis. But it explains the most important things that must be understood before mastering the subject. It is a preparation for reading the more advanced and authoritative texts on uncertainty. In particular, this Guide will be useful preparation for reading the United Kingdom Accreditation Service (UKAS) Publication M 3003 'The Expression of Uncertainty and Confidence in Measurement' [2].

The Beginner's Guide is not the 'last word' on uncertainty of measurement - far from it. It gives only the basic concepts. Although the information given is correct and in line with good practice, it is not complete or rigorous. It does not cover any difficult or special cases. (Section 15, 'Words of warning', briefly lists some cases where the basic procedures given in the Beginner's Guide would not be sufficient.) For more complete information, the references detailed in the 'Further reading' section of the Guide should be consulted.

At the time of publication, individual copies of A Beginner's Guide to Uncertainty of Measurement can be requested free of charge, by telephoning the NPL Helpline 020 8943 6880, or by e-mailing enquiry@npl.co.uk

References

[1] Bell, Stephanie, (1999), *A Beginner's Guide to Uncertainty of Measurement,* Measurement Good Practice Guide No. 11, National Physical Laboratory, UK, ISSN 1368-6550.

[2] UKAS publication M 3003 *The Expression of Uncertainty and Confidence in Measurement* Edition 1, December 1997.