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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently, **JIS Z 9031**:2001 is replaced with this Standard.

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Procedure for random number generation and randomization

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **ISO 28640** published in 2010 by incorporating the parts corresponding to this Standard without any modification of the technical contents, but also adding some **JIS** specification contents that are not given in the said corresponding International Standard.

The portions with continuous sidelines or dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JB.

This Standard specifies typical algorithms by which the users can regard the generated numerical series as if they were real random number sequence.

Nowadays, most statisticians, scientists and engineers have enough computer power at their disposal to carry out large computer simulations, and it is becoming important that these are based on theoretical sound pseudo-random number generations. This Standard has been developed to help ensure that randomization, where needed, is carried out correctly and efficiently.

Six examples in which randomization can be identified in statistical standardization are shown below.

- Selection of random sample
- Analysis of sample data
- Development of standards
- Check of theoretical results
- Demonstration of properties of proposed procedure
- Resolution of uncertainty in statistical literature

In this Standard, the regulation of randomization procedure is added to that of algorithm of random number generation and its characteristics.

1 Scope

This Standard specifies the uniform random numbers for Monte Carlo simulation purpose, the methods for random number generation from various distributions such as the normal distribution, and the methods of randomization. However, in this Standard, cryptographic random number generation methods are not included. This Standard is applicable, *inter alia*, to the following.

- Researchers, industrial engineers or experts in operations management who use statistical simulation.
- Statisticians who need randomization related to SQC methods, statistical design of experiments or sample surveys.
- Applied mathematicians who plan complex optimization procedures that require the use of Monte Carlo method.