AS/NZS IEC 61703:2020
IEC 61703:2016

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Australian/New Zealand Standard™

Mathematical expressions for reliability, availability, maintainability and maintenance support terms

AS/NZS IEC 61703:2020

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The following are represented on Committee QR-005:

Asset Management Council (Australia)
Australian Industry Group
Department of Defence (Australian Government)
Engineering New Zealand
Engineers Australia
Human Factors and Ergonomics Society of New Zealand
Institution of Occupational Safety and Health
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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee QR-005, Dependability.

The objective of this Standard is to provide mathematical expressions for selected reliability, availability, maintainability and maintenance support measures defined in IEC 60050-192:2015. In addition, it introduces some terms not covered in IEC 60050-192:2015. They are related to aspects of the system of item classes (see hereafter).

According to IEC 60050-192:2015, dependability [192-01-22] is the ability of an item to perform as and when required and an item [192-01-01] can be an individual part, component, device, functional unit, equipment, subsystem, or system.

To account for mathematical constraints, this Standard splits the items between the individual items considered as a whole (e.g. individual components) and the systems made of several individual items. It provides general considerations for the mathematical expressions for systems as well as individual items but the individual items which are easier to model are analysed in more detail with regards to their repair aspects.

The following item classes are considered separately:

(a) Systems;

(b) Individual items —

  (i) non-repairable [192-01-12];

  (ii) repairable [192-01-11] —

    (A) with zero (or negligible) time to restoration;

    (B) with non-zero time to restoration.

In order to explain the dependability concepts which can be difficult to understand, keep the Standard self-contained and the mathematical formulae as simple as possible, the following basic mathematical models are used in this standard to quantify dependability measures:

(i) Systems —

  (A) state-transition models;

  (B) Markovian models.

(ii) Individual items —

  (A) random variable (time to failure) for non-repairable items;

  (B) simple (ordinary) renewal process for repairable items with zero time to restoration;

  (C) simple (ordinary) alternating renewal process for repairable items with non-zero time to restoration.

The application of each dependability measure is illustrated by means of simple examples.

This Standard is mainly applicable to hardware dependability, but many terms and their definitions may be applied to items containing software.

This Standard is identical with, and has been reproduced from, IEC 61703:2016, *Mathematical expressions for reliability, availability, maintainability and maintenance support terms*.

As this document has been reproduced from an International Standard, the following applies:

(A) In the source text "this International Standard" should read "this Australian/New Zealand Standard".

(B) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.