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Design, Test, and Evaluation Division
Reference Document 46.1

Terms Commonly Used in the Digital Analysis of Dynamic Data



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1 SCOPE AND LIMITATIONS

The purpose of this Reference Document (RD) is to define, clarify, and disseminate terminology appropriate for digital analysis of dynamic data as used in environmental testing.

This list is in no manner constrained by any standards publications, technical organizations, or societies. However a reasonable effort has been made to keep the definitions consistent with these standards. This document is intended for use by those responsible for procuring, manufacturing, and using computer-controlled environmental test systems, as well as those responsible for educating others in the field of environmental test control.

2 INTRODUCTION

This Reference Document (RD) contains certain terms commonly used in digital analysis of dynamic data generated when measuring in-service conditions of mechanical and electrical apparatus. This RD also covers certain conditions encountered during qualification testing of mechanical systems and components. Recognizing that there are many ways in which dynamic data signals are generated, recorded, processed, and displayed, wherever a choice exists we have emphasized processing of recorded data by digital means.

This document is intended to assist those involved in recording, analyzing, displaying, or interpreting data relating to the dynamic properties of mechanical systems. Such data may include strain, vibration, sound pressure variations, and system electrical characteristics.

In running text, boldface type is used to indicate terminology that is defined in this RD.

3 TERMS AND DEFINITIONS

accelerance

See **inertance**, **mechanical impedance**.

acceleration SRS

See **shock response spectrum**.

accuracy

The degree of conformity of a measure to a model, standard, or true value. Usually expressed as a percentage of specified value. Should consider other dependent factors such as temperature, frequency, relative value (full scale vs absolute), drift rates, and range.

aliasing

When the sample rate f is less than 2 times the highest frequency in the data, the frequency is ambiguously represented. The frequencies above $f/2$ will be folded back into the lower frequencies to produce erroneous results.

amplitude density function

See **probability density function**.

amplitude distribution function

See **probability distribution function**.

analog-to-digital converter (ADC)

An electronic device used for converting analog signals to digital form, either binary code or binary-coded-decimal. An ADC is usually used in conjunction with a multiplexer that selects a particular analog signal and with a sample-and-hold amplifier that stores an instantaneous analog voltage. The ADC digitizes (see **digitize**) that voltage into N discrete levels, where $N = 2^n$ and n is the number of bits of resolution in the device. For dynamic waveforms, the sampling frequency must be high enough to avoid aliasing errors.

analysis range/bandwidth

See **frequency range**.