Recommendation B.16[1)]

USE OF CERTAIN TERMS LINKED WITH PHYSICAL QUANTITIES

The CCITT,

considering

(a) that ITU technical texts contain a number of terms expressing a relationship between quantities, such as quotient, ratio, coefficient, factor, index, constant, rate, etc., and that their meaning is liable to cause confusion owing to a lack of consistency;

(b) that the situation is particularly confused owing to the existence of three working languages, as can be seen from such texts as the Provisional Glossary of Telecommunications Terms published by the ITU in 1979;

(c) that attempts at standardization have been made in certain countries, in vocabularies recently prepared by the IEC and the JCG and in ISO International Standards,

recommends

(1) that certain terms linked with physical quantities should be used by authors and translators of ITU texts, according to the guidelines annexed to this Recommendation;

(2) that these guidelines should be used to ensure that the term chosen to denote a quantity, fully describes its nature;

(3) that these guidelines should be followed when forming new terms or reviewing existing terms which deviate from the guidelines.

ANNEX A

(to Recommendation B.16)

Guidelines for the use in ITU texts of certain terms linked with physical quantities in French, English and Spanish

A.1 *Quotient*

The term “quotient” is used to express the result of the division of two numbers or two quantities. For example; when A/B = C, C is the quotient of A by B.

This very general mathematical term is not used in the composition of the names of quantities, but does form part of the definition of some of them.

In the context of definitions, quotient is a difficult word to use in English as it is often much more practical to use the expression “A divided by B” rather than “the quotient of A by B”.

Example: the pulse repetition frequency is the number of pulses in a pulse train divided by the duration of the pulse train.

A.2 *Coefficient and factor*

The words ”coefficient” and “factor” are used for expressions representing the quotient of two quantities. They are used to form terms expressing certain quantities.

A.2.1 *Coefficient*

The word “coefficient” is used when two quantities are of different kinds. A coefficient has therefore a dimension.

Examples:

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1) A similar text will be submitted to the CCIR as a revision of Recommendation 663.

Note: **Table is missing**

The word “coefficient” is also used in mathematics to express a number that multiplies the value of an algebraic quantity and in statistics (see ISO Standard 3534).

Examples:

Note: **Table is missing**

A.2.2 *Factor*

The word “factor” is used when the two quantities are of the same kind. A factor is therefore dimensionless.

Examples:

Note: **Table is missing**

A.3 *Constant*

The term “constant” should only be used to denote an invariable number or quantity.

Examples: mathematical constants such as π, universal physical constants.

Note: **Table is missing**

The word “constant” is sometimes used incorrectly, in conjunction with a qualifier, to indicate a variable characteristic quantity of a system or substance. In such cases, the use of the word is deprecated, and a specific term should be used (frequently the word “coefficient” suitably qualified) or in French, in the absence of such a term, the word “caractéristique”.

Note: **Table is missing**

However, the term “time constant” (E), “constante de temps” (F), “constante de tiempo” (S) is acceptable, as it is in common use.

A.4 *Index*

In French and Spanish the term “indice” (F), “índice” (S) is sometimes used instead of “facteur” (F), “factor” (S). In English “index” is sometimes used instead of “ratio” in those cases where one of the two quantities is a reference quantity.

Examples:

Note: **Table is missing**

The term also designates a quantity which is not clearly defined or which is identifiable rather than measurable.

Example:

Note: **Table is missing**

In all the above cases extension of the usage of the term is not recommended. It should be replaced wherever possible by the terms coefficient, factor or (in English) ratio, or by a specific term of magnitude. Thus the French term “L'indice de force des sons” was replaced by “l'affaiblissement pour la sonie”, “loudness rating” (E), “coeficiente de sonoridad” (S).

A.5 *Ratio*

The term “ratio” is used to express the result of the division of two numbers or two quantities of the same kind. It may therefore be used in this case as an equivalent of the term “quotient”.

Examples:

— Attenuation is defined as the ratio of two powers.

— Ratio of A to B.

— Ratio of width to height (picture).

In English and in Spanish, the word “ratio” (”relación”) is also used to explicitly indicate the fractional expression of the relationship between two quantities before the division is performed, e.g. written as a fraction or a relationship as 5/21 or 5 : 21 rather than the resulting 0.238. The two quantities may or may not be the same, e.g. power/weight ratio, relación potencia/peso.

In French and in Spanish the term “rapport” (F) (“relación” (S)) should not be used when the two quantities are not the same physical kind, or when they are of a different mathematical kind, for example, to express the quotient of a vector or a tensor by a scalar number.

The word is also used to form terms for expressing dimensionless quantities.

Examples:

Note: **Table is missing**

Note — Error ration is normally expressed as a decimal fraction, e.g. $4 \cdot 10^{-5}$.

A.6 *Rate, ratio (E); Taux, débit (F); Tasa/proporción/frecuencia (S)*

The term “taux” in French designates a factor usually expressed as a percentage or any decimal fraction such as a thousandth or a millionth. It does not always correspond with the English term “rate”. In particular, it should not be used to express the relationship of a quantity with a unit of time. In such cases, an appropriate term such as “débit” (F), “fréquence” (F), “vitesse” (F) should be used. An exception which has been established by usage is “failure rate” (E), “taux de défaillance” (F), “tasa de fallos” (S) in the field of reliability.

Although in English the term “rate” may be used to express the relationship between two quantities of the same kind, it is generally used to express the relationship of quantities of a different kind (particulaarly a quantity per unit of time). For expressing the proportion of errors in telecommunication however, the use of this term can be confusing and is deprecated. The term “ratio” should be used for this purpose.

In Spanish, the term “tasa” should not be used to express the relationship between a quantity and the unit of time. There are a number of different terms which should be used for this purpose depending on the quantity e.g. “velocidad” (S) for distance, “frecuencia” (S) for events, “caudal” (S) for volume flow, etc.

In Spanish, the term “tasa” is also frequently used incorrectly to indicate a factor or index usually expressed as a percentage or in hundredths or as a smaller decimal fraction such as a thousandth or millionth. The use of this erm for this term for this purpose in Spanish is deprecated and should be replaced by the term “proporción” (S).

Examples:

Note: **Table is missing**