Evaluation of measurement data — Guide to the expression of uncertainty in measurement. AMENDMENT 1: Non-linearity in measurement models

Évaluation des données de mesure — Guide pour l'expression de l'incertitude de mesure. AMENDEMENT 1: Non-linéarité dans les modèles de mesure

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Evaluation of measurement data — Guide to the expression of uncertainty in measurement. AMENDMENT 1: Non-linearity in measurement models

Page 9, **4.1.4**

Designate the existing NOTE as NOTE 2 and add the following new NOTE 1:

NOTE 1 When the nonlinearity of f is significant, higher-order terms in a Taylor series expansion of $Y = f(X_1, X_2, \ldots, X_N)$ must be included in the expression for y in Equation (2). When the distribution of each X_i is normal, the most important terms of next highest order to be added to the right-hand side of Equation (2) are

$$\frac{1}{2}\sum_{i=1}^{N}\frac{\partial^2 f}{\partial x_i^2}u^2(x_i).$$

Equation (H.10) provides a generalization for the case of non-independent normal X_i.

Page 85, **H.1.7 Second-order terms**

Change the first paragraph as follows:

Note 1 to 4.1.4 and the note to 5.1.2 point out that Equations (2) and (10), which are used in this example to obtain the estimate l of the measurand and the associated combined standard uncertainty $u_c(l)$, must be augmented when the nonlinearity of the function $Y = f(X_1, X_2, \ldots, X_N)$ is so significant that the higher-order terms in the Taylor series expansion cannot be neglected. Such is the case in this example, and therefore both the calculation of l and the evaluation of $u_c(l)$ as presented up to this point are not complete. It is easily checked that the first expression given in note 1 to 4.1.4 is equal to zero, so that the estimate l is unaffected by higher-order terms. Instead, the application to Equation (H.3) of the expression given in the note to 5.1.2 yields in fact two distinct non-negligible second-order terms to be added to Equation (H.5). These terms, which arise from the quadratic term in the expression of the note, are

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END OF THE AMENDMENT

