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MEDEDELINGEN VAN DE LANDBOUWHOGESCHOOL TE WAGENINGEN, NEDERLAND **60** (16) 1–2 (1960)

A SYSTEMATIC METHOD FOR PLACING INDICES TO SYMBOLS

by

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(Received 1.12.'60)

INTRODUCTION

In the work at the Laboratory of Physics of the Agr. University at Wageningen it has appeared to Prof. VAN WIJK and others, that in many problems with regard to heat balance it is impossible to use the normalised symbols without indices. An energy flux density H, *e.g.*, must be used for different surfaces.

For clarity, it is useful to distinguish the different items. Somebody has had recourse to characters other than the standardised symbols, but this appears open to strong criticism. The other way is to join indices to the symbol. A possible method, but one, however, which does not allow full expression, is to add numbers, *e.g.*, x_1, x_2 *etc.* A more systematic method was used by the author in evaporation studies (WARTENA, 1959). This system seems to be efficient and has possibilities for application to other fields of physics. Therefore, it will be described here.

DESCRIPTION

Let the symbol be X, then it is possible to use four indices

$$\begin{matrix} x_3 & & x_2 \\ & X & \\ x_4 & & x_1 \end{matrix}$$

The meaning of the four places is as follows:

x_1 refers to X; this is the place mostly used;

x_2 refers to x_1;

x_3 gives an indication of second importance for X, or for a magnitude which has no direct connection with X.
In the case of radiation, x_1 can be used as an indication for e.g. the wave length, x_3 for the surface where the radiation is absorbed.

x_4 is only to be used in exceptional circumstances.

Abbreviations can be used for the indices. A list with abbreviations used must then follow the list of symbols. It is sometimes possible to use standardised symbols as indices. This is preferable.

Examples

${}^{wa}_{ab}H^{df}_{sh}$ The absorbed part *(ab)* of the energy flux density *(H)* of the diffuse short wave radiation *(sh, df)* received by a water surface *(wa)*.

${}^{wa}H^{ai}_{lo}$ The energy flux density *(H)* of the temperature radiation (long wave) *(lo)* from the air *(ai)* received by a water surface *(wa)*.

H^{wa}_{lo} The energy flux density *(H)* of the long wave radiation *(lo)* from a water surface *(wa)*.

H^{cr}_{ev} The energy flux density *(H)* of the latent heat by evaporation *(ev)* of a crop *(cr)*.

${}^{z,t}\theta_{wa}$ Temperature in °K *(θ)* of the water at depth *z* and time *t*.

${}^{z,t}\theta^{la}_{wa}$ The same for the water in a lake *(la)*.

${}^{so}a_{sh}$ Absorption coefficient *(a)* of the short wave radiation *(sh)* of the soil *(so)*.

Reference

WARTENA, L.: Het klimaat en de verdamping van een meer in Centraal Irak. Mededelingen Landbouwhogeschool Wageningen **59** (9), 1–90 (1959).