

WEIGHTED VARIANCE**PURPOSE**

Compute the weighted variance of a variable.

DESCRIPTION

The formula for the variance is:

$$s^2 = \frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N - 1} \quad (\text{EQ 2-23})$$

while the formula for the weighted variance is:

$$s_w^2 = \frac{\sum_{i=1}^N w_i (x_i - \bar{x}_w)^2}{\frac{(N' - 1) \sum_{i=1}^N w_i}{N'}} \quad (\text{EQ 2-24})$$

where w_i is the weight for the i th observation, N' is the number of non-zero weights, and \bar{x}_w is the weighted mean of the observations. Weighted variances are often used for frequency data.

SYNTAX

LET <par> = WEIGHTED VARIANCE <y> <SUBSET/EXCEPT/FOR qualification>

where <y> is a response variable;

<weights> is a variable containing the weights;

<par> is a parameter where the weighted variance is saved;

and where the <SUBSET/EXCEPT/FOR qualification> is optional.

EXAMPLES

```
LET VAR = WEIGHTED VARIANCE Y1 WEIGHT
```

```
LET VAR = WEIGHTED VARIANCE Y1 WEIGHT SUBSET TAG > 2
```

DEFAULT

None

SYNONYMS

None

RELATED COMMANDS

VARIANCE	=	Compute the variance of a variable.
WEIGHTED MEAN	=	Compute the weighted mean of a variable.
WEIGHTED STANDARD DEVI	=	Compute the weighted standard deviation of a variable.

APPLICATIONS

Data Analysis

IMPLEMENTATION DATE

94/11 (there was an error in the computation for earlier versions)

PROGRAM

```
LET Y = DATA 2 3 5 7 11 13 17 19 23
LET W = DATA 1 1 0 0 4 1 2 1 0
LET A = WEIGHTED VARIANCE Y W
```

The value 33.9 will be returned for the weighted variance.