TRNSYS Type 816 „Transient Value Averaging over Time"

Version 2.0, Michel Haller, 21.02.2010

1 Summary

Type 816 delivers the average of a time-dependent value. A maximum of 20 inputs can be averaged with individual averaging times for each one of them. Until the simulation reaches the time of averaging, the average will be taken of all available values (without time 0). As soon as the time of averaging is reached, only the values from current time minus time of averaging will be considered.

2 Parameter-List

Nr.	short	explanation	unit	range
1	NrV	number of values to be averaged	--	[0;20]
2,3,...	tav1, ...	time of averaging for value 1, value 2, etc.	[h]	[0;+inf]

3 Input-List

Nr.	short	explanation	unit	range
1	Va1	value 1	any	[-inf;+inf]
2,3,...	Va2,Va3,...	value 2, value 3, ...	any	[-inf;+inf]

4 Output-List

Nr.	short	explanation	unit	range
1	V1av	average of value 1 over time	any	[-inf;+inf]
2,3,...	V2av, V3av,...	average of value 2,3, etc. over time	any	[-inf;+inf]

5 Calculations

In order to calculate the average, this Type must store all values back to the current time minus the time of averaging. Type 816 does not simply add all values together each timestep and divide the result by the number of timesteps in the averaging period, but performs the calculations shown below. These calculations are a lot faster when dealing with long averaging periods over many timesteps.

$$X = \frac{dtAverage}{dtSim}$$

$$SUM_N = SUM_{N-1} + Value_N - Value_{N-X}$$

$$Average_N = \frac{SUM_N}{X}$$

X [-]		number of timesteps to be averaged
$dtAverage$ [h]		time of averaging
$dtSim$ [h]		simulation timestep
SUM_N [any]		sum of all values within the last X timesteps
$Value_N$ [any]		instant value of the variable at timestep N
$Average_N$ [any]		average of the variable calculated for timestep N