Block PVAV

The PVAV block calculates the output voltage and the temperature of a (micro-) amorphous photovoltaic generator, depending on PV generator current, global radiation on the generator plane, ambient temperature, and wind speed.



Name	PVAV
Function	se0028
Inputs	3 . . . [5]
Outputs	2
Parameters	28
Strings	0
Group	S

Inputs

1 Current I / A
2 Global radiation on the generator plane G / W m^{-2}
3 Temperature T / °C
4 Wind speed close to the generator v_w / m s^{-1}
5 Time t / s

Outputs

1 Voltage V / V
2 Cell temperature T_c / °C

Parameters

1 Mode
- 0 The cell temperature is given by input 3.
- 1 The cell temperature depends on the thermal parameters of the PV modules and the inputs of the block; initial value of the cell temperature is given by parameter number 26.
- 2 The difference between cell temperature and ambient temperature is a linear function of the global radiation (input 2) on the basis of NOCT.

2	Number of cells in series per module N_s
3	Number of cells in parallel N_p
4	Number of modules in series M_s
5	Number of modules in parallel M_p
6	Area of a single cell A_c / m^2
7	Area of a single module A_m / m^2
8	Coefficient of short-circuit current density c_ph / V^{-1}
9	Temperature coefficient of short-circuit current c_t / $\mathrm{V}^{-1}\,\mathrm{K}^{-1}$
10	Merten parameter M / V^{-1}
11	Built-in voltage parameter v_bi / V
12	Coefficient of saturation current density c_s / $\mathrm{A\,m}^{-2}\,\mathrm{K}^{-s}$
13	Temperature exponent s of saturation current density
14	Band gap parameter e_g / eV
15	Diode ideality factor n
16	Series resistance parameter r_s / $\Omega\,\mathrm{m}^2$
17	Parallel resistance parameter r_p / $\Omega\,\mathrm{m}^2$
18	Module tolerance plus / %
19	Module tolerance minus / % (< 0)
20	Characteristic module length ℓ_m / m
21	Module weight m_m / kg
22	Absorption coefficient a
23	Emission factor ϵ
24	Specific heat of a module c_m / $\mathrm{J\,kg}^{-1}\mathrm{K}^{-1}$
25	Nominal operating cell temperature NOCT / °C
26	Initial value of cell temperature / °C
27	Error tolerance of voltage (or current) of a single cell in the numerical iteration to solve the modified one-diode-model equation
28	Maximum number of iterations to solve the modified one-diode-model equation

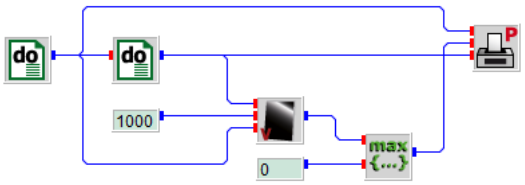
Strings

None

Description

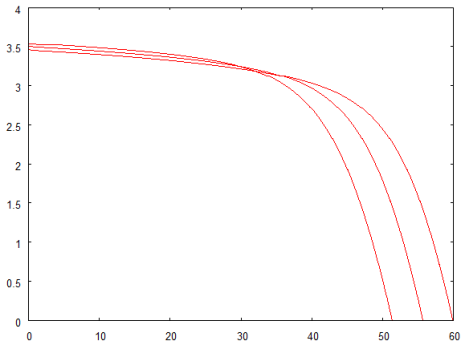
For a detailed description of the models used in the PVAV block please refer to the description of block PVAI.

pvav.vseit



Two DO blocks vary current between zero and 4 A in steps of 0.01 A and module temperature between 25 and 75 °C in steps of 25. The global radiation is set constant to 1000 W/m^2. These three signals are used by the PVAV block to simulate a micromorphous PV module with 180 cells in total.

In order to avoid the output of negative voltages a MAX block with a connected zero forces the PLOT block to display only values $V(I) \geq 0$.



See also Blocks PVAI, PVFITA.