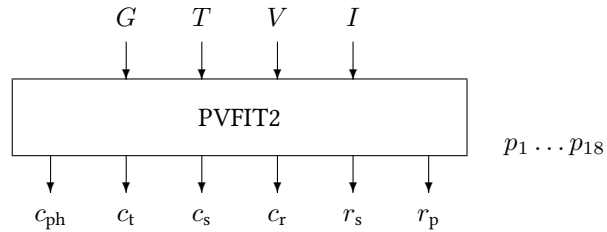


Block PVFIT2

The PVFIT2 block performs a two-diode-model fit on I-V curves of a PV module connected to the block's inputs.



Name	PVFIT2
Function	se0026
Inputs	4
Outputs	7
Parameters	18
Strings	6
Group	I

Inputs

- 1 Global radiation / W m^{-2}
- 2 Module temperature / $^{\circ}$
- 3 Module voltage / V
- 4 Module current / A

Outputs

- 1 Coefficient of short-circuit current density $c_{\text{ph}} / \text{V}^{-1}$
- 2 Temperature coefficient of short-circuit current $c_{\text{t}} / \text{V}^{-1} \text{K}^{-1}$
- 3 Coefficient of saturation current density (Shockley diode) $c_{\text{s}} / \text{A m}^{-2} \text{K}^{-3}$
- 4 Coefficient of recombination current density (Recombination diode) $c_{\text{r}} / \text{A m}^{-2} \text{K}^{-5/2}$
- 5 Series resistance parameter $r_{\text{s}} / \Omega \text{m}^2$
- 6 Parallel resistance parameter $r_{\text{p}} / \Omega \text{m}^2$
- 7 Deviation χ

Parameters

- 1 Fit procedure
 - 0 Christian Obst

- 2 Number of cells in series
- 3 Number of cells in parallel
- 4 Area of a single cell / m^2
- 5 Module area / m^2
- 6 $R_{s,\min}$ / Ωm^2
- 7 $R_{s,\max}$ / Ωm^2
- 8 Coefficient of short-circuit current density C_0 / V^{-1}
- 9 Temperature coefficient of short-circuit current C_1 / $\text{V}^{-1} \text{K}^{-1}$
- 10 Module tolerance plus / %
- 11 Module tolerance minus / % (< 0)
- 12 Characteristic module length / m
- 13 Module mass / kg
- 14 Absorption coefficient
- 15 Emission coefficient
- 16 Specific module heat capacity / $\text{J kg}^{-1} \text{K}^{-1}$
- 17 NOCT temperature / $^{\circ}\text{C}$
- 18 Overwrite mode
 - 0 Generate error (default)
 - 1 Overwrite

Strings

- 1 INSEL module ID (max. eight characters)
- 2 Path to .bp file
- 3 Module name
- 4 Manufacturer
- 5 Cell type (e. g., cristalline)

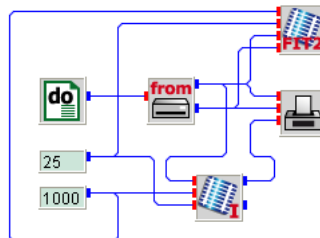
Remarks The [PVFIT2](#) block performs a fit to given data points provided by the inputs. The block requires increasing values for the voltage and a unique ($V = 0 \text{ V}$, $I = I_{\text{sc}}$) point for each curve. If the short-circuit current is not provided, the result of the [PVFIT2](#) block is unpredictable.

It is recommended to determine the photocurrent parameters c_{ph} and c_t via block [PVA2C](#) before using the [PVFIT2](#) block, since the quality of the fit depends very much on these initial values.

Please notice that the block (in its current version) can not be used to determine the two-diode model parameters from operational data but from complete I - V -curves only.

It is not possible to determine the Bishop parameters with the [PVFIT2](#) block.

pvfit2.vseit



A file with measured I - V curve data named `pvfit2.dat`, located in the `examples/data` directory for standard test conditions is read by a `READ` block driven by a `DO` block. The radiation and module temperature are set by two `CONST` blocks to 1000 W/m^2 and $25 \text{ }^\circ\text{C}$, respectively.

The tuples (G, T, V, I) are fed to the [PVFIT2](#) block which performs the parameter fit. As a result a file named `pvfit2.bp` is generated.

pvfit2.bp

```

% Filename          pvfit2.bp
% Module            pvfit2
% Manufacturer      Manufacturer
% Cell type         crystalline

% Mode must be set externally

1 % Number of cells in series N_s per module
1 % Number of cells in parallel N_p per module
1 % Number of modules in series M_s
1 % Number of modules in parallel M_p
0.0156 % Cell area A_c (m^2)
0.016 % Module area A_m (m^2)

% Electrical parameters

1.12 % Band gap (eV)
0.273035E+00 % Short-circuit current parameter C_0 (V^-1)
0.224599E-03 % Isc temperature coefficient C_1 (V^-1 K^-1)
0.293476E+04 % Shockley saturation parameter C_01 (A m^-2 K^-3)
0.223146E+01 % Recombination saturation parameter C_02 (A m^-2 K^-5/2)
0.678692E-04 % Series resistance r_s (Ohm m^2)
0.689963E+00 % Parallel resistance r_p (Ohm m^2)
0.100000E+01 % Shockley diode ideality factor alpha
2.000000 % Recombination diode quality beta
0.000000E+00 % Bishop parameter-1
0.000000E+00 % Bishop parameter-2
0.000000E+00 % Bishop parameter-3
0.0 % Module tolerance plus
0.0 % Module tolerance minus

% Thermal parameters

1.000 % Characteristic module length l_m (m)

```

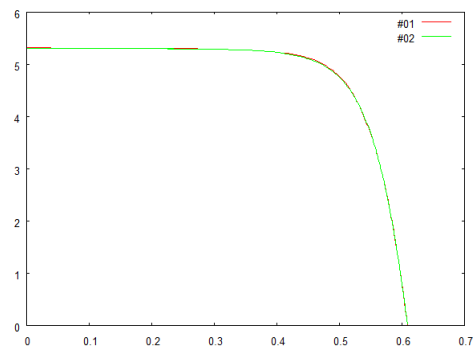
```

1.000      % Module mass m_m (kg)
0.70       % Default absorption coefficient a
0.85       % Default emission factor epsilon
900.0      % Default specific heat of a module C_mod (J kg^-1 K^-1)
47.0       % Nominal operating cell temperature NOCT (degrees C)
25.0       % Intial value of cell temperature (degrees C)

          % Numerical parameters (optional)
1E-5       % Error tolerance of voltage of single cell (V)
100        % Maximal number of iterations to solve I/V-equation

```

The parameters have been incorporated into the `pvfit2.vseit` example using a [PVI](#) block in order to demonstrate the quality of the fit. The [PLOT](#) block then shows the measured data (red curve) and the simulated points (green curve).



See also Blocks [PVI](#), [PVV](#), [PVFIT1](#).