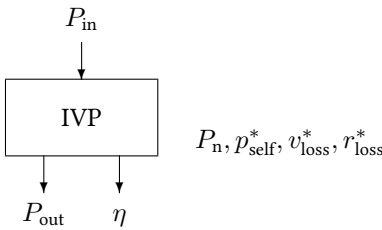


Block IVP

The IVP block simulates inverter losses.



Name	IVP
Function	se0008
Inputs	1
Outputs	2
Parameters	4
Strings	0 ... [1]
Group	S

Inputs

- 1
- DC power P_{in} / W

Outputs

- 1
- AC power P_{out} / W
- 2
- Efficiency η

Parameters

- 1
- Nominal DC power P_{n} / W
- 2
- Normalized self consumption p_{self}^*
- 3
- Normalized voltage losses v_{self}^*
- 4
- Normalized ohmic losses r_{loss}^*

Strings

- 1
- Product ID

Description The model is based on a publication by Schmidt and Sauer.

$$\eta = \frac{p_{\text{out}}}{p_{\text{in}}} = \frac{p_{\text{out}}}{p_{\text{out}} + p_{\text{loss}}}$$

where $p_{\text{out}} = P_{\text{out}}/P_{\text{n}}$ is the fraction of the output power and the nominal power, p_{loss} is a term which describes normalized self consumption, p_{self} , normalized voltage losses v_{loss} on diodes and transistors and finally normalized ohmic losses r_{loss} following the equation

$$p_{\text{loss}} = p_{\text{self}} + v_{\text{loss}}p_{\text{out}} + r_{\text{loss}}p_{\text{out}}^2$$

which describes the efficiency as a function of output power.

When the inverter input power is used as the independent variable this leads to the equations

$$p_{\text{loss}} = p_{\text{self}}^* + v_{\text{loss}}^*p_{\text{out}} + r_{\text{loss}}^*p_{\text{out}}^2$$

and

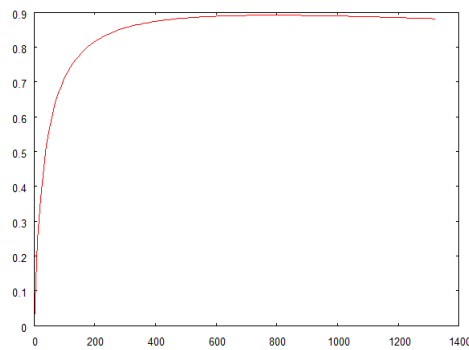
$$\eta = -\frac{1 + v_{\text{loss}}^*}{2r_{\text{loss}}^*p_{\text{in}}} + \sqrt{\frac{(1 + v_{\text{loss}}^*)^2}{(2r_{\text{loss}}^*p_{\text{in}})^2} + \frac{p_{\text{in}} - p_{\text{self}}^*}{r_{\text{loss}}^*p_{\text{in}}^2}}$$

The block **IVPFIT** can be used to determine the required parameters from manufacturers data sheets.

ivp.vseit



In a **DO** block inverter input power values are generated from 0 to 1500 W in steps of 10 W. The **IVP** block calculates the corresponding output power and efficiency. The **PLOT** block displays the efficiency as a function of the output power.



See also **Block IVPFIT**