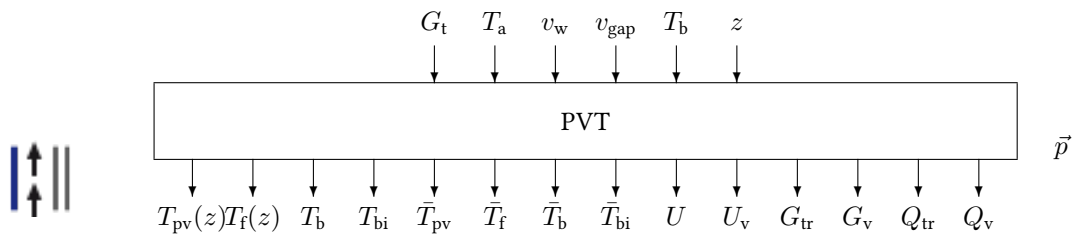


Block PVT

The PVT block simulates the thermal performance of a building-integrated PV generator within a double facade. The PV module is assumed to face exterior air, followed by a ventilation gap of variable depth and then a back glazing or insulation for the thermal separation to the room.



Name	PVT
Function	st0002
Inputs	6
Outputs	14
Parameters	13
Strings	0
Group	S

Inputs

- 1 Global radiation on the generator plane G_t / W m^{-2}
- 2 Ambient temperature T_a / $^{\circ}\text{C}$
- 3 Wind speed close to the generator v_w / m s^{-1}
- 4 Flow velocity behind the generator, i. e., in the gap v_{gap} / m s^{-1}
- 5 Temperature of generator back surface T_b / $^{\circ}\text{C}$
- 6 Height of interest z / m

Outputs

- 1 PV module temperature $T_{pv}(z)$ / $^{\circ}\text{C}$ at height z
- 2 Facade temperature $T_f(z)$ / $^{\circ}\text{C}$ at height z
- 3 Temperature of gap surface backside T_b / $^{\circ}\text{C}$
- 4 Temperature of gap surface inside T_{bi} / $^{\circ}\text{C}$
- 5 Mean PV module temperature $\bar{T}_{pv}$ / $^{\circ}\text{C}$
- 6 Mean fluid temperature $\bar{T}_f$ / $^{\circ}\text{C}$
- 7 Mean temperature of gap surface backside $\bar{T}_b$ / $^{\circ}\text{C}$
- 8 Mean temperature of gap surface inside $\bar{T}_{bi}$ / $^{\circ}\text{C}$

- 9 Transmission heat loss coefficient $U_{tr} / \text{W m}^{-2} \text{K}^{-1}$
- 10 Recovered transmission heat loss coefficient $U_v / \text{W m}^{-2} \text{K}^{-1}$
- 11 Total energy transmittance G_{tr}
- 12 Recovered energy transmittance G_v
- 13 Transmission heat loss $Q_{tr} / \text{kWh m}^{-2}$
- 14 Ventilation heat gains $Q_v / \text{kWh m}^{-2}$

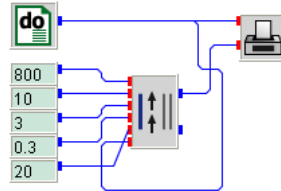
Parameters

- 1 PV module height / m
- 2 PV module width / m
- 3 PV module thickness / m
- 4 PV module efficiency under standard test conditions
- 5 PV module emissivity facing exterior air
- 6 PV module emissivity facing air gap
- 7 PV absorption coefficient
- 8 PV module transmission
- 9 PV module heat conductivity / $\text{W m}^{-1} \text{K}^{-1}$
- 10 Air gap depth / m
- 11 Back glazing absorption coefficient of facing room
- 12 Back glazing emissivity facing the air gap
- 13 Back glazing/insulation heat resistance / $\text{m}^2 \text{K W}^{-1}$

Strings

None

pvt.vseit



A ventilated PV façade with the following parameters is simulated:

PV module height	6.5
PV module width	0.994
PV module thickness	0.01
PV module efficiency under standard test conditions	0.12
PV module emissivity facing exterior air	0.88
PV module emissivity facing air gap	0.88
PV absorption coefficient	0.8
PV module transmission	0.1
PV module heat conductivity	0.8
Air gap depth	0.14
Back glazing absorption coefficient of facing room	0.05
Back glazing emissivity facing the air gap	0.88
Back glazing/insulation heat resistance	1.5

All inputs of the **PVT** block are set constant by **CONST** blocks, except the height, which is varied between zero and the total height of the air gap of 6.5 m. The increment of the **DO** block is 0.1 m.

The **PLOT** block displays the PV module temperature as a function of height.

