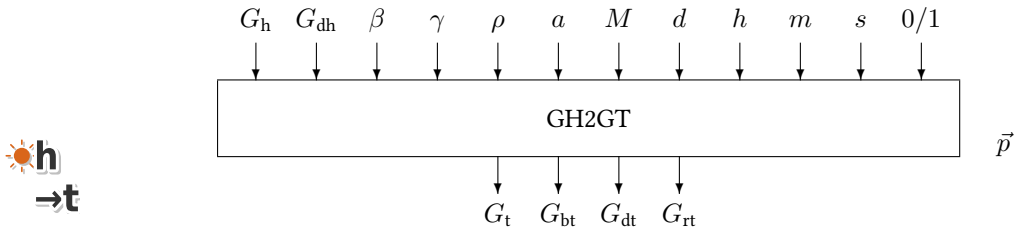
Block GH2GT

Warning: This block is deprecated, because it used a west-positive convention for longitudes. Please use GH2GT2 instead, with east-positive longitudes.

The GH2GT block calculates the radiation on a tilted surface from horizontal data.



Name	GH2GT
Function	em0008
Inputs	9 . . . [12]
Outputs	4
Parameters	4
Strings	0
Group	S

Inputs

1	Global radiation horizontal G_h / W m^{-2}
2	Diffuse radiation horizontal G_{dh} / W m^{-2}
3	Slope β / °
4	Azimuth orientation of surface γ / °
5	Ground reflectance $\rho \in [0, 1]$
6	Year a (for example 2010)
7	Month $M \in [1, 12]$
8	Day $d \in [1, 31]$
9	Hour $h \in [0, 23]$
10	Minute $m \in [0, 59]$
11	Second $s \in [0, 60)$
12	Daylight saving time (0 no, 1 yes)

Outputs

1	Global radiation on tilted surface G_t / W m^{-2}
2	Beam radiation on tilted surface G_{bt} / W m^{-2}

3 Diffuse radiation on tilted surface G_{dt} / W m^{-2}
4 Reflected radiation on tilted surface G_{rt} / W m^{-2}

Parameters

1 Model
- 0 Liu, Jordan
- 1 Temps, Coulson
- 2 Bugler, Hay, Kambezidis
- 3 Klucher
- 4 Hay
- 5 Willmott
- 6 Skartveit, Olseth
- 7 Gueymard
- 8 Perez et al.
- 9 Reindl et al.

2 Latitude $\varphi \in [-90°, +90°]$, northern hemisphere positive
3 Longitude $\lambda \in [0°, 360°)$, Greenwich $= 0$, **west positive**
4 Time zone $Z \in [0, 23]$, e. g., Central European Time: $Z = 23$

Strings

None

Description The first parameter determines how the diffuse radiation part is handled.

Liu, Jordan In the Liu/Jordan model it is assumed that the diffuse radiation is isotropically distributed over the whole sky dome. The global radiation on a tilted surface is calculated by

$$G_t = G_{bh}\frac{\cos\theta}{\cos\theta_z} + \frac{1}{2}\,G_{dh}(1+\cos\beta) + \frac{1}{2}\,\rho\,G_h(1-\cos\beta)$$

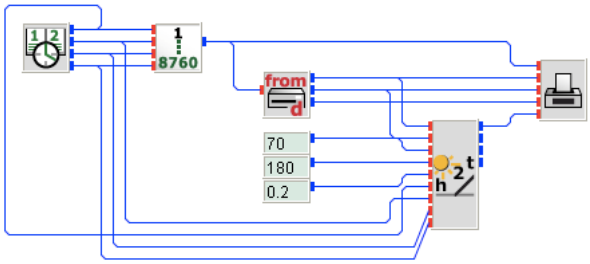
where

θ Incidence angle of beam radiation

θ_z Zenith angle

The first term of the sum defines G_{bt}, the second G_{dt} and the third one G_{rt}.

gh2gt.vseit



A CLOCK block runs through the first seven days of February 2010 in steps of one hour. The output signals are converted to the hour of the year which define the record number for the READD block and the x-coordinate of the PLOT block.

The READD blocks reads three values per record of the file `meteo82.dat` from the `examples/data` directory, namely the global radiation horizontal, the diffuse radiation and the tilted radiation facing south with a tilt of 70 degrees. These data are connected to the inputs of the GH2GT block and the PLOT block. The albedo is assumed constant with 20 percent.

The PLOT block displays the data for comparison in the order global radiation horizontal, diffuse radiation, measured tilted radiation, and simulated tilted ratiation.

