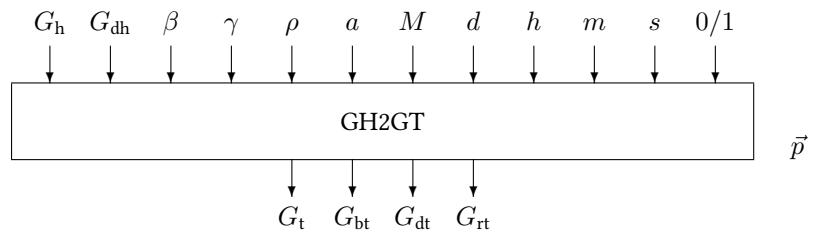


## Block GH2GT

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.



|                   |            |
|-------------------|------------|
| <b>Name</b>       | GH2GT      |
| <b>Function</b>   | em0008     |
| <b>Inputs</b>     | 9 ... [12] |
| <b>Outputs</b>    | 4          |
| <b>Parameters</b> | 4          |
| <b>Strings</b>    | 0          |
| <b>Group</b>      | S          |

### Inputs

- 1 Global radiation horizontal  $G_h$  /  $\text{W m}^{-2}$
- 2 Diffuse radiation horizontal  $G_{dh}$  /  $\text{W m}^{-2}$
- 3 Slope  $\beta$  /  $^\circ$
- 4 Azimuth orientation of surface  $\gamma$  /  $^\circ$
- 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  $G_t$  /  $\text{W m}^{-2}$
- 2 Beam radiation on tilted surface  $G_{bt}$  /  $\text{W m}^{-2}$

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

#### 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  $\varphi \in [-90^\circ, +90^\circ]$ , northern hemisphere positive
- 3 Longitude  $\lambda \in [0^\circ, 360^\circ)$ , 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

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

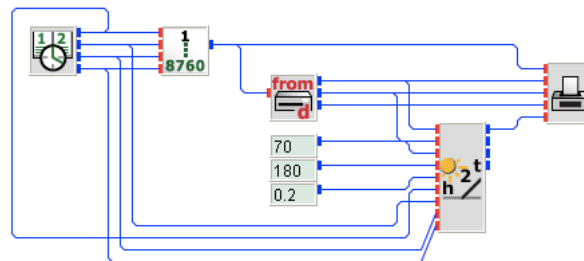
where

$\theta$  Incidence angle of beam radiation

$\theta_z$  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 radiation.

