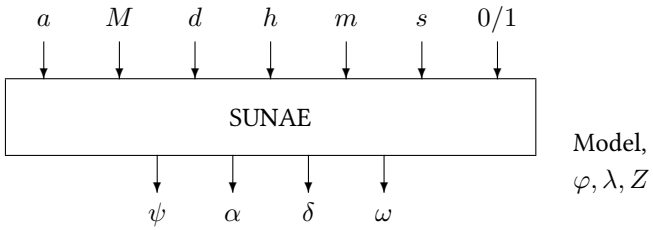
Block SUNAE

Warning: The explicit usage of this block is deprecated, because it uses a west-positive convention for longitudes.

Please use SUNAE2 instead, with east-positive longitudes. SUNAE is still used internally by SUNAE2. The SUNAE block calculates the position of the Sun in horizon and equator coordinates.





Name	SUNAE
Function	em0006
Inputs	4 . . . [7]
Outputs	4
Parameters	4
Strings	0
Group	S

Inputs

1	Year a (for example 2010)
2	Month $M \in [1, 12]$
3	Day $d \in [1, 31]$
4	Hour $h \in [0, 23]$
5	Minute $m \in [0, 59]$
6	Second $s \in [0, 60)$
7	Daylight saving time (0 no, 1 yes)

Outputs

1	Azimuth ψ (north $= 0°$, east $= 90° \ldots$ west $= 270°$)
2	Elevation α / °
3	Declination δ / °
4	Hour angle ω ($0° \ldots 360°$west)

Parameters

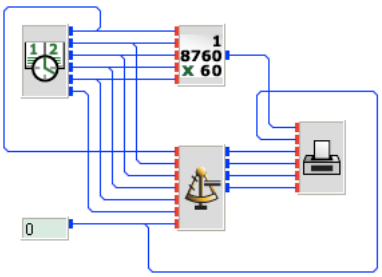
1 Approximation
  0 Spencer
  1 Holland/Mayer
  2 Michalsky
2 Latitude $\varphi \in [-90°, +90°]$, northern hemisphere positive
3 Longitude $\lambda \in [0°, 360°)$, Greenwich $= 0°$, west positive
4 Time zone $Z \in [0, 23]$, e. g. Central European Time: $Z = 23$

Strings

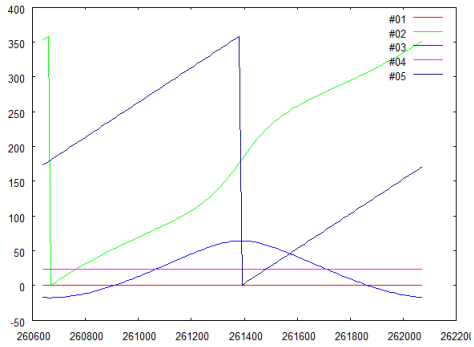
None

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sunae.vseit



A CLOCK block varies the time of 01 July 2010 in steps of ten minutes. The SUNAE block calculates the position of the Sun for the location of Stuttgart, Germany. In order to provide a zero line a CONST block with value zero has been added. The minute-of-the-year block MOY provides a convenient scale for the x-axis of the PLOT block which displays the curves on screen.



Please notice the conventions used by INSEL:

01 Just the zero line

02 The azimuth angle is counted from 0 to 360 degrees, starting in the north with zero, clockwise positive. Consequently, when the Sun is in the South the azimuth angle is equal to $90°$, independent whether the location is on the northern orthe southern hemisphere.

03 The elevation. If positive, the Sun is above the horizon.

04 The declination is positive when the during a day the Sun appears in the zenith in the northern hemisphere, otherwise negative.

05 The hour angle is zero for the upper culmination of the Sun. As a consequence, true solar noon corresponds to an hour angle $\omega = 0°$