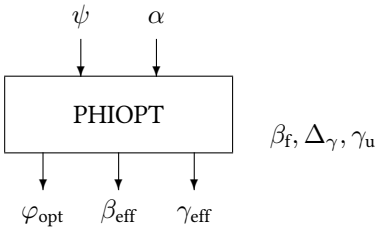
Block PHIOPT

The PHIOPT block calculates the optimum rotation angle for a one-axis tracked receiver.





Name	PHIOPT
Function	em0038
Inputs	2
Outputs	3
Parameters	3
Strings	0
Group	S

Inputs

1 Solar azimuth ψ / °
2 Solar elevation α / °

Outputs

1 Optimum rotation angle φ_{opt} / °
2 Effective tilt angle β_{eff} / °
3 Effective azimuth angle γ_{eff} / °

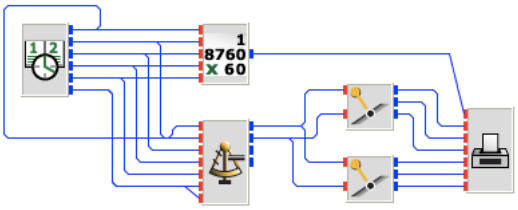
Parameters

1 Tilt angle of fixed rotation axis β_{f} / °
2 Deviation of axis from north/south direction (clockwise positive) Δ_γ / ° $\in [-90, 90]$
3 Azimuth angle if undefined γ_{u} / °
4 Mechanical limit towards east (degrees < 0, zero defaults to -90)
5 Mechanical limit towards west (degrees > 0 zero defaults to $+90$)

Strings

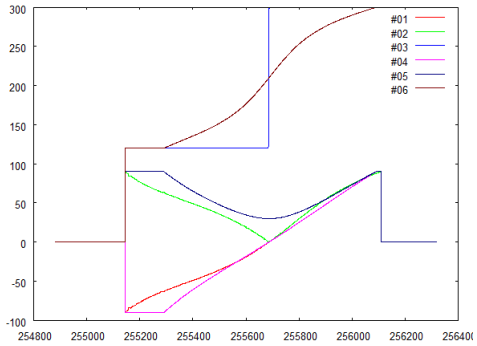
None

phiopt.vseit In this example two tracking systems with different orientations are compared.



The first (upper PHIOPT block) simulates a horizontal rotation axis, the other (lower PHIOPT block) an axis with a tilt angle of 30 degrees. In both cases it is assumed that the deviation from north/south direction is $+30$ degrees, i. e., approximately south/west.

The model is controlled by a CLOCK block which runs through the 27$^{\text{th}}$ of June 2010 in steps of one minute. The SUNAE block is used to calculate the position of the Sun as required by the PHIOPT blocks. The MOY block is used as convenient x-coordinate for the PLOT block.



The six curves show the triples optimum rotation angle (01 and 04), effective tilt angle (02 and 05) and effective azimuth angle (03 and 06). As could be expected both tracking systems face the eastern direction in the morning hours and west in the afternoon (red and magenta curves). The effective tilt angles start with 90 degrees with a tendency towards low values around noon. Due to the asymmetry of the rotation axis with respect to south the azimuth angles vary between 120 and 300 degrees, respectively.