Validation of the block inclined_surface with Meteonorm data

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Version of Model, Carnot, Matlab and Operation system

surfrad.c (V 5.1.0), Carnot 5.2, Matlab R2010b, Windows XP

Complete path of the block in the Carnot Library

Carnot/weather/inclined_surface

1 Data used for validation

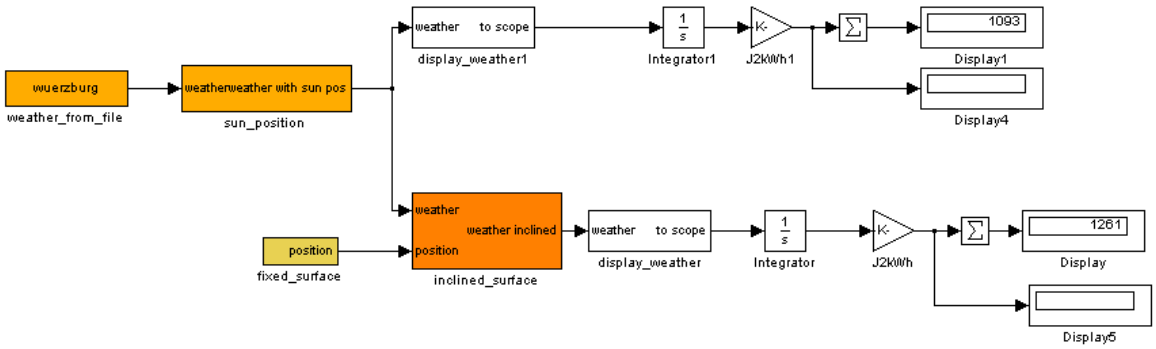
Meteonorm Version 6.1

2 Description of the model

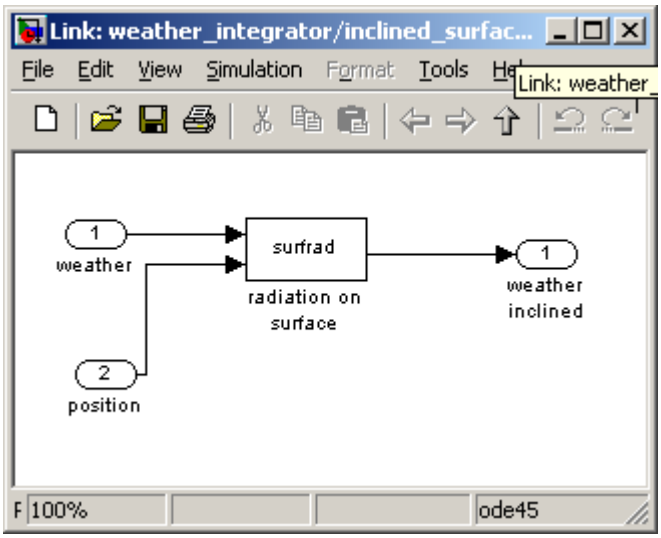
2.1 Block

Detailed description of the equations is given by Duffie (2006).

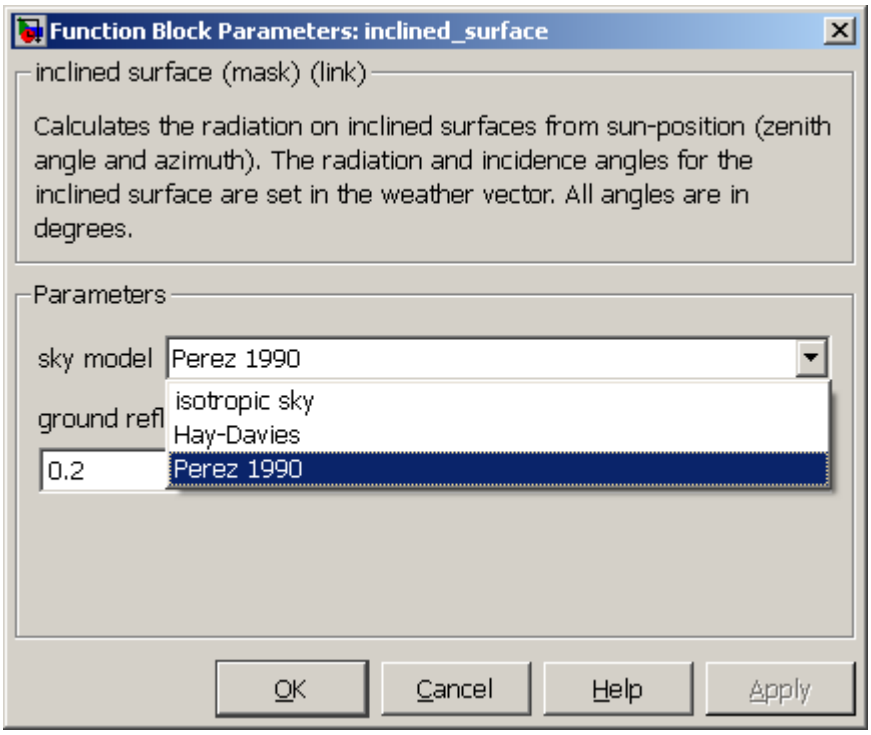
Model for the comparison:



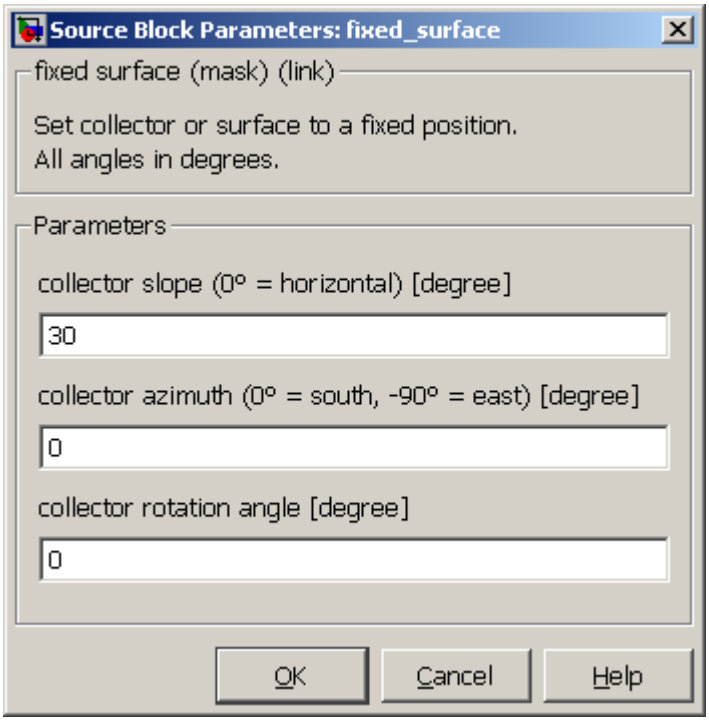
“Look under Mask” of the Block:



Block parameters:



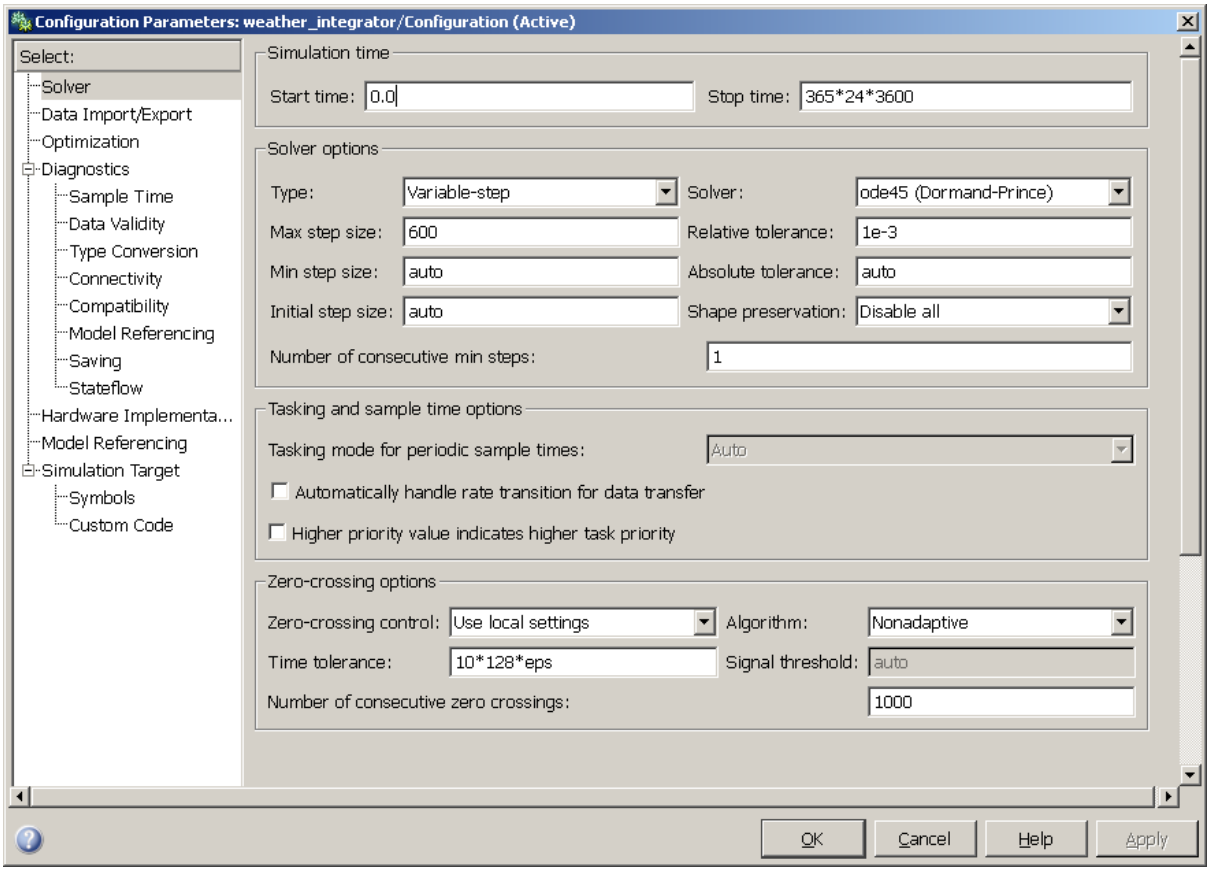
The Position is varied:



2.2 Model File

Comparison of horizontal and inclined solar radiation for the location Wuerzburg (Germany), results of Meteonorm and Carnot are compard. The input for Carnot is the Meteonorm weather data file generated for the same location using the 5.x Carnot weather data format (including direct normal radiation).

Solver parameters:



3 Results

Annual sum of solar radiation in kWh/m²

Perez Sky Model, ground reflectance 0.2

Azimut	Inclination	**Meteonorm Global**	CARNOT Global	**Meteonorm Diffuse**	CARNOT Diffuse
0	0	**1093**	1092	**594**	593
0	30	**1257**	1255	**628**	629
0	60	**1178**	1178	**583**	585
0	90	**882**	883	**471**	474
45	30	**1192**	1190	**614**	614
45	60	**1102**	1101	**565**	567
45	90	**846**	846	**461**	464
-90	30	**1041**	1044	**574**	576
-90	60	**906**	912	**511**	516
-90	90	**699**	707	**421**	427
120	30	**903**	901	**545**	544
120	60	**715**	715	**470**	471
120	90	**547**	548	**388**	391
-180	30	**775**	774	**512**	512
-180	60	**484**	486	**414**	415
-180	90	**373**	376	**350**	351

4 Literature

Duffie, J., Beckman, W.: Solar Engineering of thermal processes, John Wiley & Sons Inc, 2006