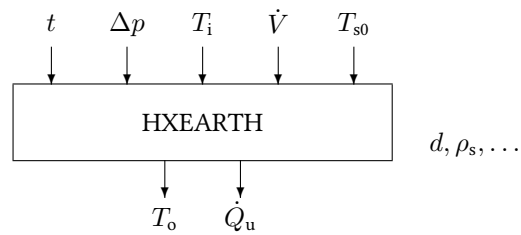


Block HXEARTH

The HXEARTH block calculates the outlet temperature of a part of a system of parallel horizontal groundheat collectors, taking into account the influence of the ground surface temperature and the groundwater level.



Name	HXEARTH
Function	st0031
Inputs	5
Outputs	2
Parameters	18
Strings	0
Group	S

Inputs

- 1 Time t / s
- 2 Pressure loss of the system Δp / Pa
- 3 Inlet air temperatur T_i / °C
- 4 Total mass flow $\dot{V}$ / m³/s
- 5 Undisturbed soil temperature T_{s0} / °C

Outputs

- 1 Outlet air temperature T_o / °C
- 2 Useful heat $\dot{Q}_u$ / W

Parameters

- 1 Depth of the tube below ground d / m
- 2 Soil density ρ_s / kg m⁻³
- 3 Heat capacity of the soil c_p / J kg⁻¹ K⁻¹
- 4 Heat conductivity of the soil λ / W m⁻¹ K⁻¹
- 5 Tube radius r / m
- 6 Total tube length l / m

Average distance between heat collector and building	5
Number of tubes in parallel	2
Distance between centers of tubes	5
Attenuation factor	0.1
Ground temperature phase delay	150

The [Depth of the tube below ground](#) parameter is set to the value [TubeDepth](#) which is a global variable defined to be 1.0, because this parameter is also required by the [TSOIL](#) block as input from a [CONST](#) block with its parameter set to [TubeDepth](#) as well.

Almost all inputs of the [HXEARTH](#) block are set constant through [CONST](#) blocks. The pressure loss of the system is 1000 Pa, the inlet air temperature is set to 25 °C, and the total air mass flow is 1 m³/s.

The required soil temperature is calculated by the [TSOIL](#) block after DIN 4710 for the region of Mannheim, German.

The simulated time period is 8760 hours as specified by a [DO](#) block. Since the [HXEARTH](#) block expects the time signal in seconds, a [GAIN](#) block is used to convert the hour signal of the [DO](#) block to the second of the year. A [PLOT](#) block displays the outlet air temperature of the earth heat exchanger as a function of the hour of the year.

