ISE (MatLab 6.5 or higher)

Abstract:
ISE (Indoor temperature Simulink Engineering tool) is a tool for simulating the indoor temperature of 1 zone of a building. ISE is a simplified model (compared with WISE) and has a user-friendly graphical user interface in SimuLink, providing quick results.

ISE can be used in SimuLink (V5.0 or higher) for:
a) a quick evaluation of the indoor temperature performance
b) a quick estimation of heating, cooling amounts and capacities
c) a building model for the design and evaluation of systems and controllers

1. Starting
1) Copy the zipfile to your computer and unzip. (remember the directory of the zipfile)
2) Start MatLab
3) Change directory to the ISE files by using the 'Current Directory' window
4) Start Simulink by typing 'simulink' at the MatLab prompt
5) Open (in SimuLink) the file 'BuildingV6Clim.mdl'
6) Press start button (Simulation / Start).
2. Getting Output
At the right hand side of the BuildingV6Clim.mdl model window, colored output icons are present. Double clicking the icon gives a graphical representation of the corresponding output. The next outputs are present:

2.1 temperatures
Time series of the next temperatures [°C]: Te (external temperature), Tvloer (internal floor&furniture temperature), Toppi (internal surface temperature of the construction), Toppe (external surface temperature of the construction), Ti (internal temperature).

2.2 heating/cooling
Time series of the heat flow [W] to the zone. Positive values represent heating, negative values represent cooling.

2.3 cold day
Time series during the coldest day of the next temperatures: Te (external temperature), Tvloer (internal floor&furniture temperature), Toppi (internal surface temperature of the construction), Toppe (external surface temperature of the construction), Ti (internal temperature).

2.4 warm day
Time series during the warmest day of the next temperatures: Te (external temperature), Tvloer (internal floor&furniture temperature), Toppi (internal surface temperature of the construction), Toppe (external surface temperature of the construction), Ti (internal temperature).

2.5 histogram temperatures
Histogram (percentage of time) of the internal temperature.

2.6 histogram heating/cooling
Histogram (percentage of time) of the heat flow to the zone.

2.7 primary energy & cost
Pie chart of the used primary energy and costs for heating and a pie chart for cooling.
3 Changing parameters
In order to get results after a change of parameters, a new simulation has to be started by the start button (Simulation / Start).
Double clicking a component icon gives an input window for the corresponding component. The next input windows are present

3.1 Climate data ...
Climate data are present for the period 1971 – 2000 for the Dutch location 'de Bilt'. This input window is used for start and end time of the simulation.

3.2 Q Windows ...
This input window is used for entering the parameters for one out of 4 windows. Note, to exclude a windows, enter a zero at the window surface.
3.3 Building Zone
This input window is used for entering the parameters of the building zone. Note that
the zone is ventilated with the external temperature.

![Image of Building Zone parameters]

3.4 heating/cooling capacities
This input window is used for entering maximum heating capacity and cooling capacity.

Note, if only heating is installed set Cooling capacity to zero and visa versa

![Image of Heating/Cooling capacities parameters]

3.5 energy efficiencies & cost
In this window, the primary energy related efficiencies of the heating&cooling and the
energy costs of heating&cooling (unit m² gas or kWh) can be adapted.
3.6 $T$ setpoint
This input window is used for entering the setpoint temperature of the internal temperature of the zone.

3.7 $Q$ internal
This input window is used for entering internal gain of the zone.