

EXAMPLE 1-9 Radiation Effect on Thermal Comfort

Modelica code

```
model Example_1_9 "Radiation Effect on Thermal Comfort"
  import Modelica.Constants;
  import Modelica.SIunits;
  import Modelica.SIunits.Conversions;
  import Modelica.SIunits.Conversions.NonSIunits;

  parameter Real epsilon(min=0,max=1) = 0.95 "Emissivity (-)";

  parameter SIunits.Area A_s(min=0) = 1.4 "Area (m^2)";
  parameter NonSIunits.Temperature_degC T_surr(min=-273.15) = 15 "Surr. T (C)";
  parameter NonSIunits.Temperature_degC T_s(min=-273.15) = 30 "Surf. T (C)";
  parameter NonSIunits.Temperature_degC T_wall_summer(min=-273.15) = 25 "W. T s. (C)";
  parameter NonSIunits.Temperature_degC T_wall_winter(min=-273.15) = 10 "W. T w. (C)";

  output SIunits.HeatFlowRate Q_rad_summer "Radiation heat losses in summer (W)";
  output SIunits.HeatFlowRate Q_rad_winter "Radiation heat losses in winter (W)";

  SIunits.Temperature T_s_K = Conversions.from_degC(T_s);
  SIunits.Temperature T_wall_winter_K = Conversions.from_degC(T_wall_winter);
  SIunits.Temperature T_wall_summer_K = Conversions.from_degC(T_wall_summer);

equation
  Q_rad_summer = epsilon*Constants.sigma*A_s*(T_s_K^4-T_wall_winter_K^4);
  Q_rad_winter = epsilon*Constants.sigma*A_s*(T_s_K^4-T_wall_summer_K^4);

end Example_1_9;
```