Heat transfer in buildings

Vidéo n°2

Thermal-electrical analogy 2

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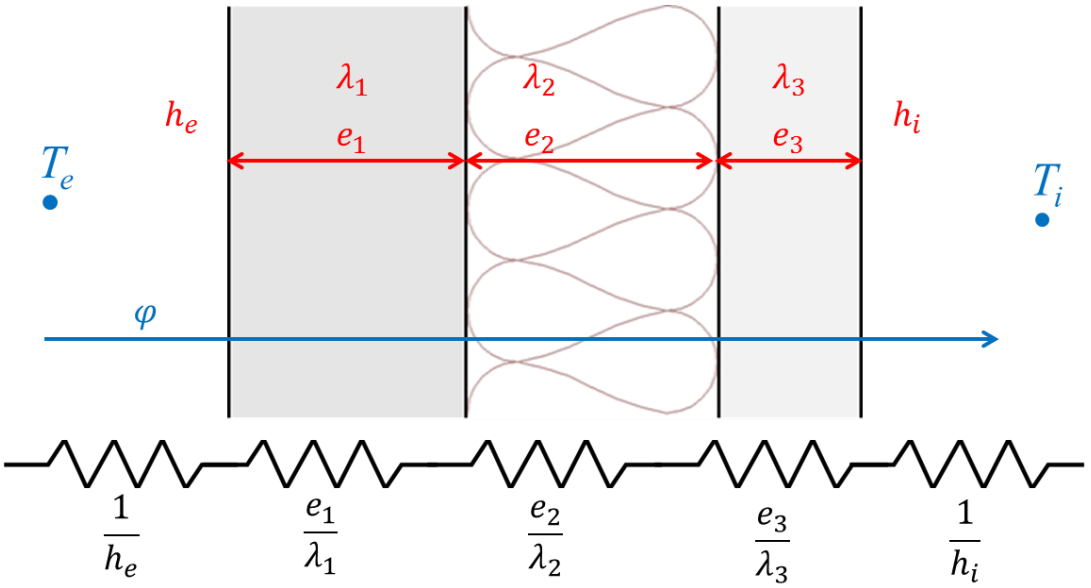
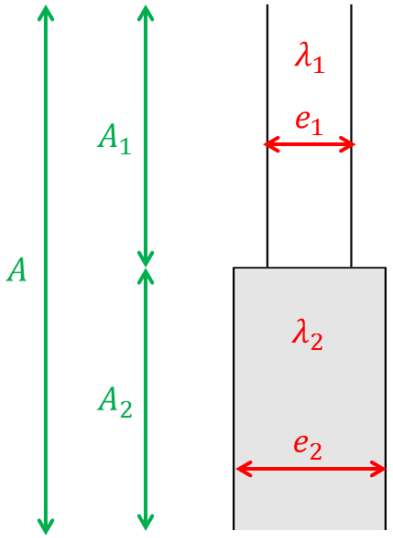
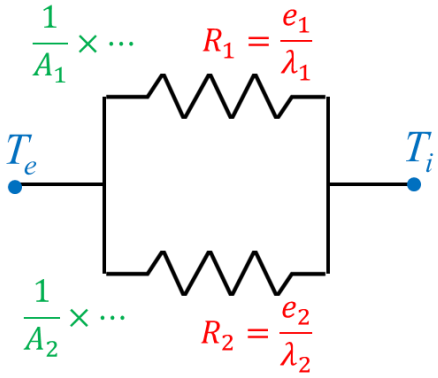
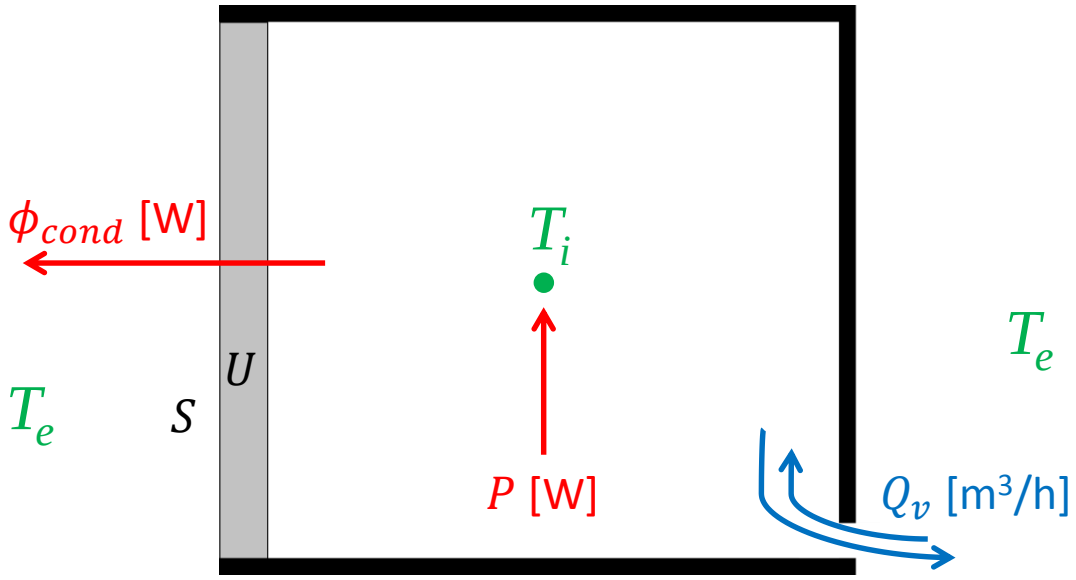
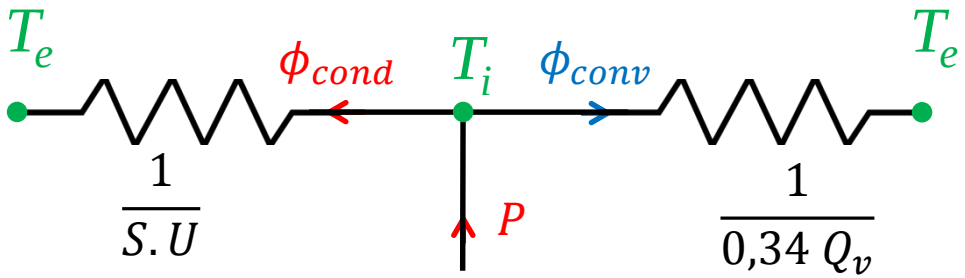

h_e
λ_1
e_1
λ_2
e_2
λ_3
e_3
h_i
T_e
T_i
φ
$\frac{1}{h_e}$
$\frac{e_1}{\lambda_1}$
$\frac{e_2}{\lambda_2}$
$\frac{e_3}{\lambda_3}$
$\frac{1}{h_i}$


A
A_1
A_2
λ_1
e_1
λ_2
e_2


$\frac{1}{A_1} \times \cdots$
$R_1 = \frac{e_1}{\lambda_1}$
T_e
T_i
$\frac{1}{A_2} \times \cdots$
$R_2 = \frac{e_2}{\lambda_2}$



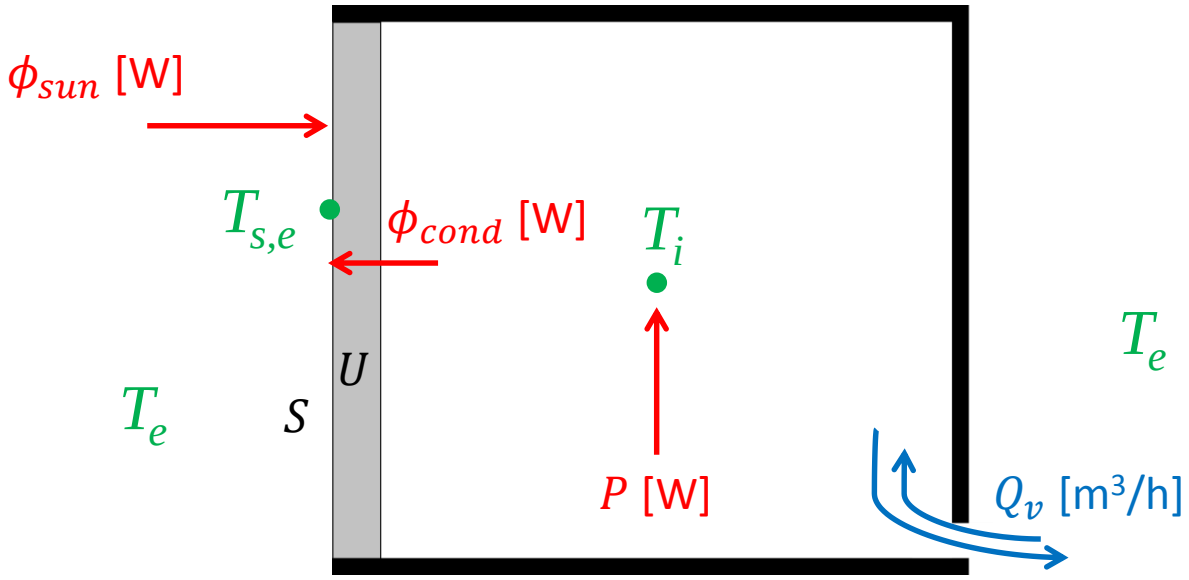


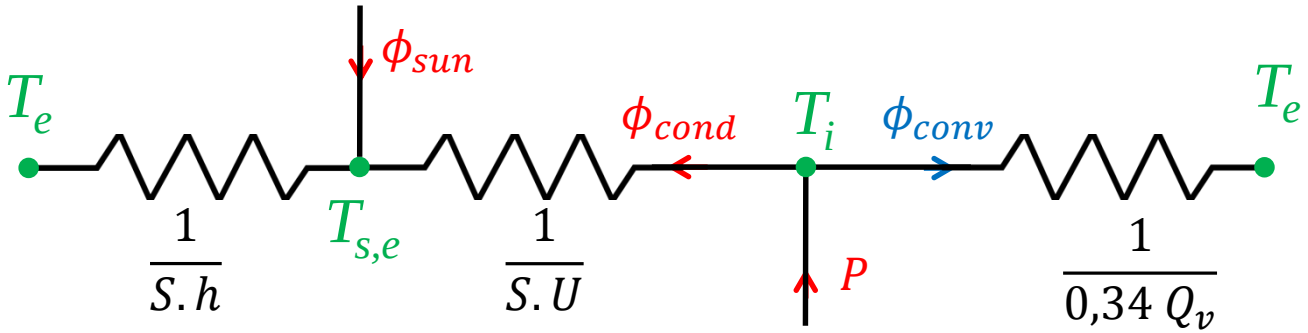
$$\phi_{cond} = S.U(T_i - T_e) \quad [W]$$

$$\phi_{conv} = 0{,}34\ Q_v(T_i - T_e) \quad [W]$$

$$P = S.U(T_i - T_e) + 0{,}34\ Q_v(T_i - T_e) \quad = D\ (T_i - T_e)$$

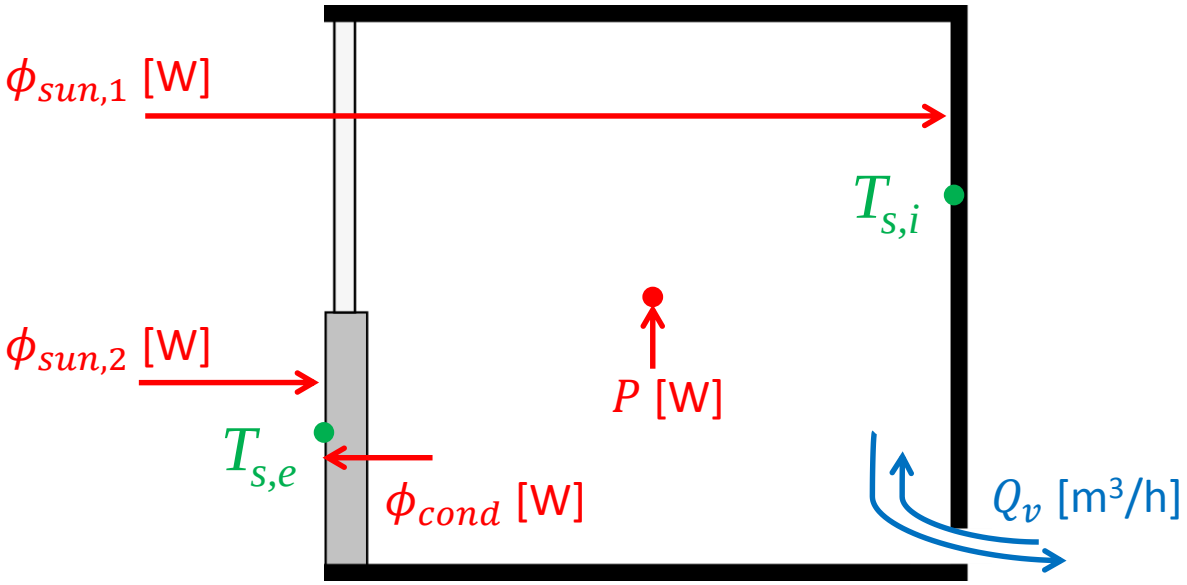
avec $D = S.U + 0{,}34\ Q_v$ [W/K]

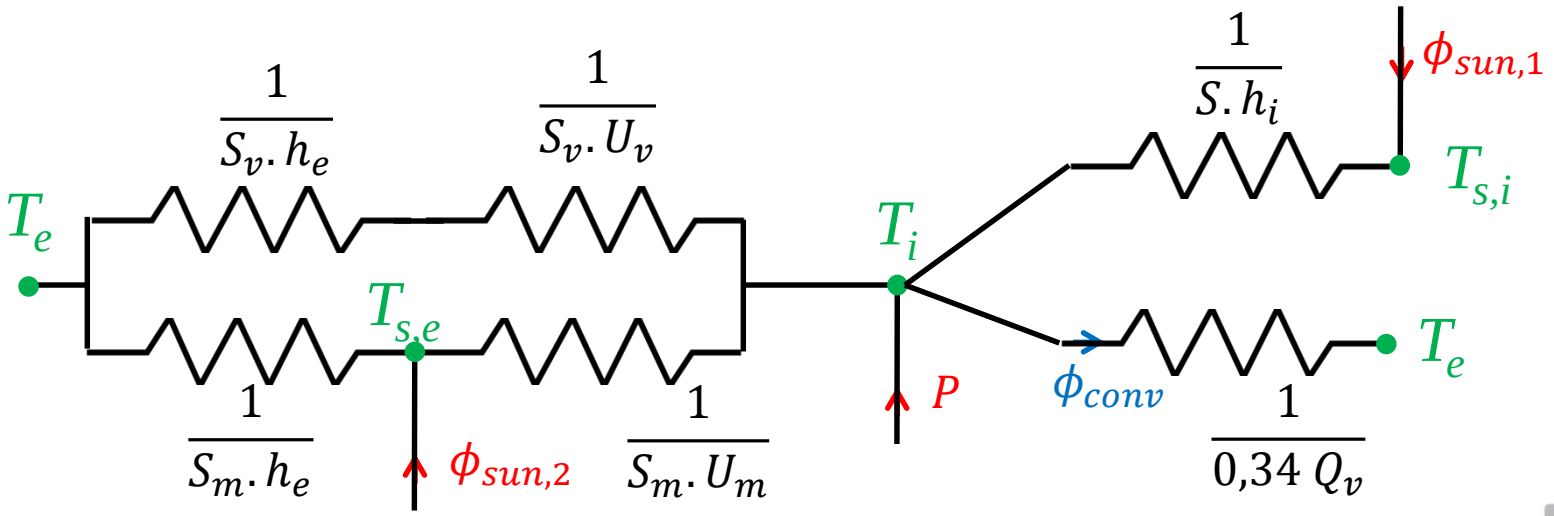


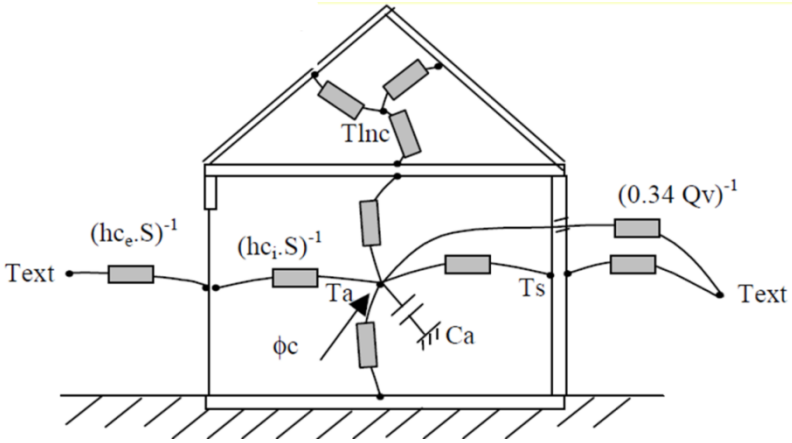


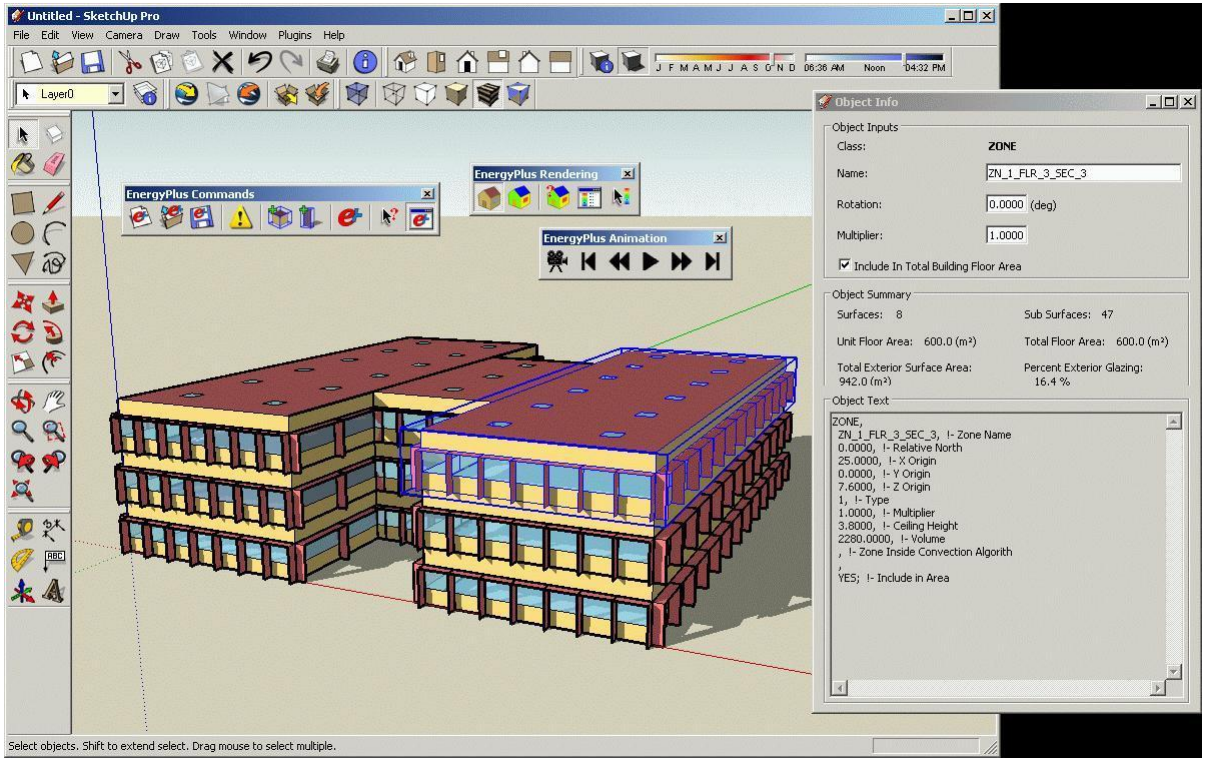
$$P = S.U(T_i - T_{s,e}) + 0{,}34\ Q_v(T_i - T_e)$$

$$\phi_{CLO} = S.h(T_{s,e} - T_e) + S.U\ (T_{s,e} - T_i)$$


$\phi_{sun,1}$ [W]
$T_{s,i}$
$\phi_{sun,2}$ [W]
P [W]
$T_{s,e}$
ϕ_{cond} [W]
Q_v [m³/h]


$\frac{1}{S_v.h_e}$
$\frac{1}{S_v.U_v}$
$\frac{1}{S.h_i}$
$\phi_{sun,1}$
T_e
T_i
$T_{s,i}$
$T_{s,e}$
T_e
P
ϕ_{conv}
$\frac{1}{S_m.h_e}$
$\phi_{sun,2}$
$\frac{1}{S_m.U_m}$
$\frac{1}{0{,}34\ Q_v}$


Tlnc
(0.34 Qv)-1
(hce.S)-1
(hci.S)-1
Text
Ta
Ts
Text
ϕc
Ca


Untitled - SketchUp Pro
File Edit View Camera Draw Tools Window Plugins Help
EnergyPlus Commands
EnergyPlus Rendering
EnergyPlus Animation
Object Info
Object Inputs
Class: ZONE
Name: ZN_1_FLR_3_SEC_3
Rotation: 0.0000 (deg)
Multiplier: 1.0000
Include In Total Building Floor Area
Object Summary
Surfaces: 8
Sub Surfaces: 47
Unit Floor Area: 600.0 (m²)
Total Floor Area: 600.0 (m²)
Total Exterior Surface Area: 942.0 (m²)
Percent Exterior Glazing: 16.4 %
Object Text
ZONE,
ZN_1_FLR_3_SEC_3, !- Zone Name
0.0000, !- Relative North
25.0000, !- X Origin
0.0000, !- Y Origin
7.6000, !- Z Origin
1, !- Type
1.0000, !- Multiplier
3.8000, !- Ceiling Height
2280.0000, !- Volume
, !- Zone Inside Convection Algorith
,
YES; !- Include in Area
Select objects. Shift to extend select. Drag mouse to select multiple.