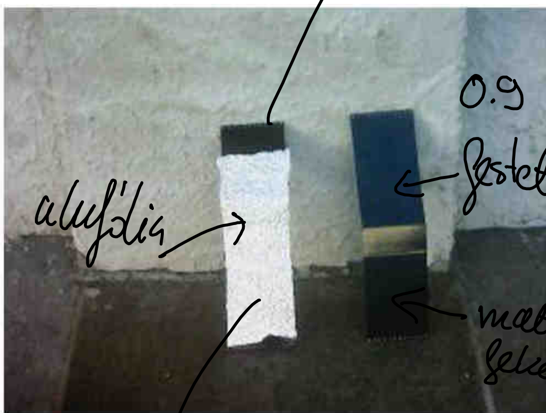
00 - IR...

2016. október 20.
14:11

Kartonpapír

$\varepsilon \simeq 0.05 \ldots$



0.9

festett

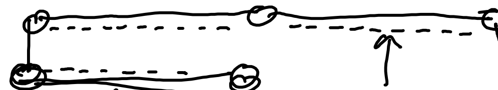
alufólia

matt fekete

$\varepsilon = 0.05$

" $\varepsilon \cong 0.99 \ldots$

ér



$\varepsilon \cong 0.837$

$\varepsilon = 0.1 - 0.15$

normál üv.

$\varepsilon = 0.837$

$\downarrow$

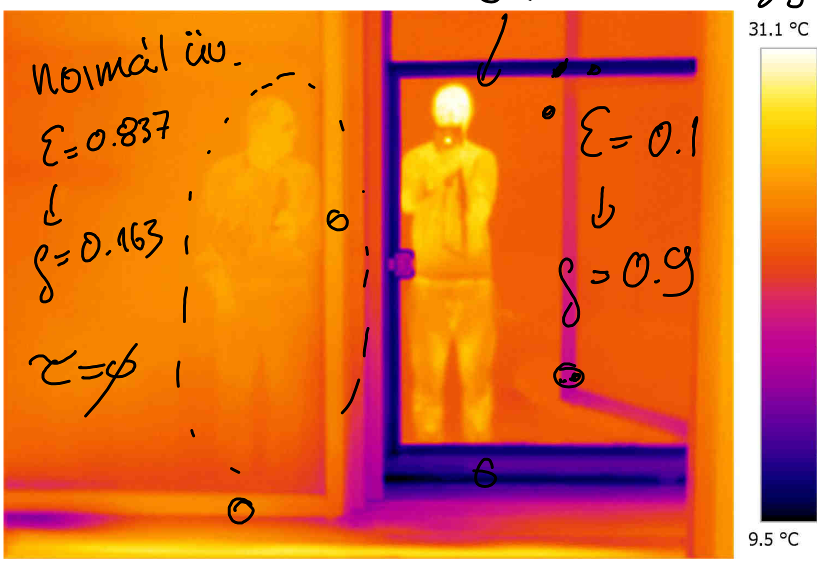
$\rho = 0.163$

$\tau = \emptyset$

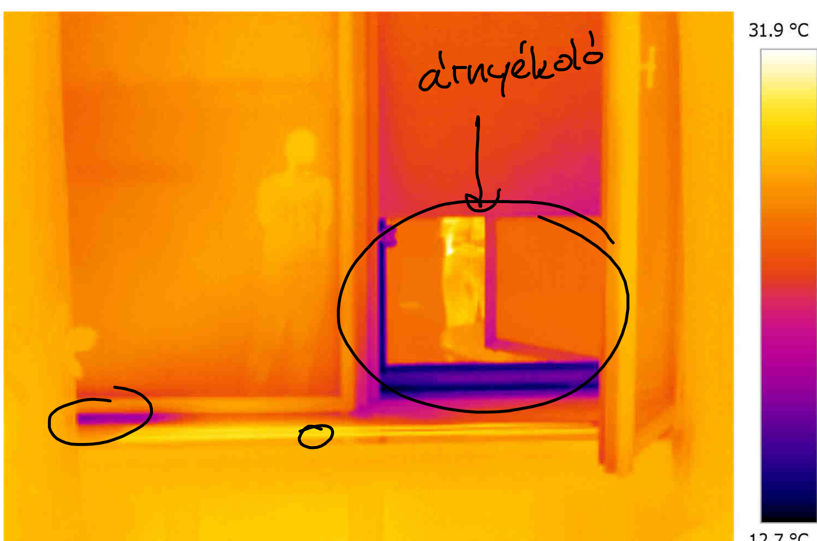
$\varepsilon = 0.1$

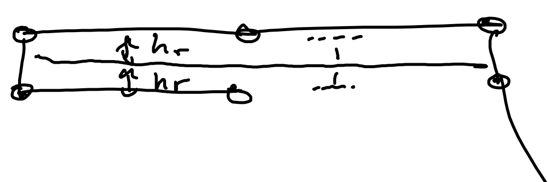
$\downarrow$

$\rho = 0.9$



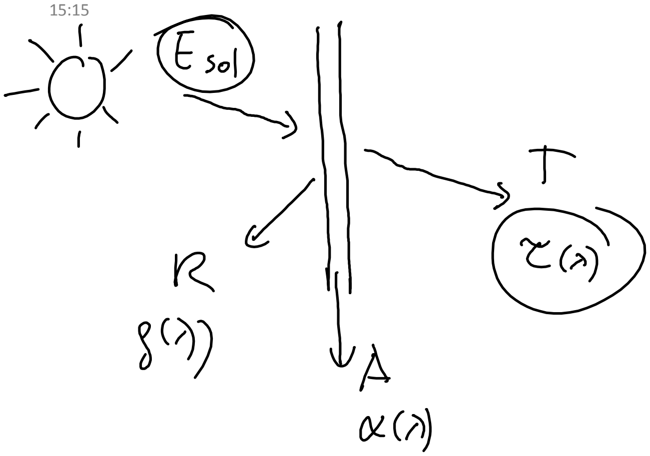
árnyékoló

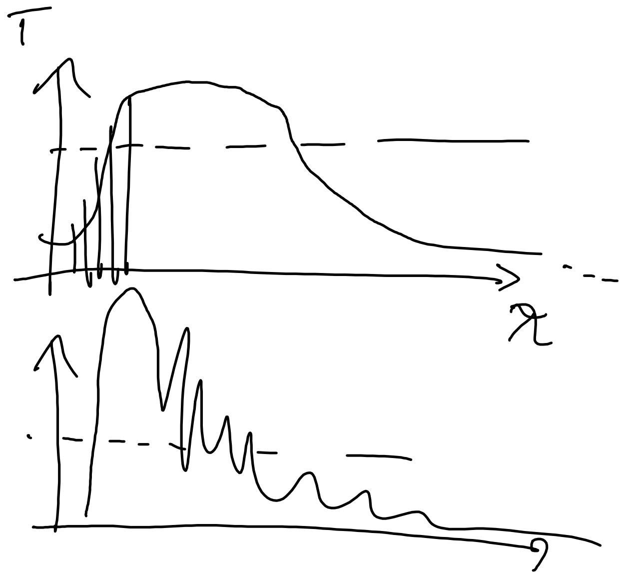




$$\varepsilon_0 T_{MRT}^4 = \varepsilon_1 \cdot F_1 \cdot T_1^4 + \varepsilon_2 \cdot F_2 \cdot T_2 + \dots \varepsilon_n F_n \cdot T_n^4$$

a vizsgált test
emissziós t.





ISO 9845-1

AM=1.5 $\quad \lambda_1 = 2500\,nm$ $\quad$ SIR

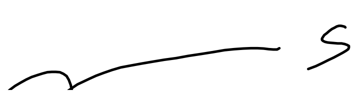
$$E_{sol} = \int_{\lambda_0}^{\lambda_1} S(\lambda)\, d\lambda \quad \left[\frac{W}{m^2}\right]$$

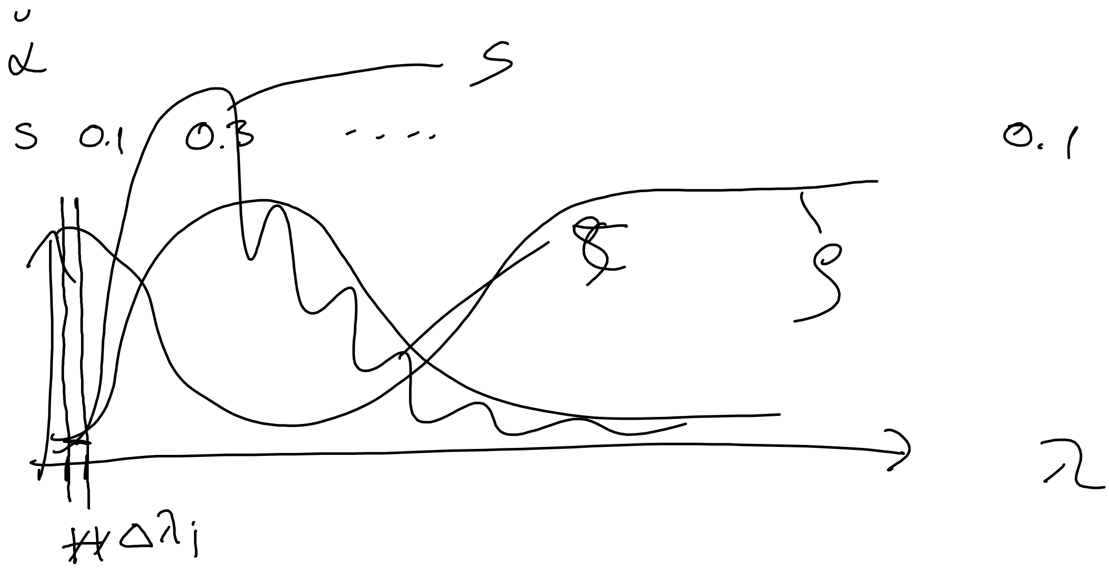
$\lambda_0 = 300\,nm$

UV $\left[\frac{W}{m^3}\right]$

$$T = \frac{\int_{\lambda=300}^{\lambda=2500} \tau(\lambda)\cdot S(\lambda)\, d\lambda}{\int_{\lambda=300}^{\lambda=2500} S(\lambda)\, d\lambda} = \frac{\text{célbocs.}}{\text{teljes beeső}} = \frac{\sum_{j=1}^{n-1} \tau(\lambda_j,\lambda_{j+1})\, S(\lambda_j,\lambda_{j+1})\,\Delta\lambda_j}{\sum_{j=1}^{n-1} S(\lambda_j,\lambda_{j+1})\,\Delta\lambda_j}$$

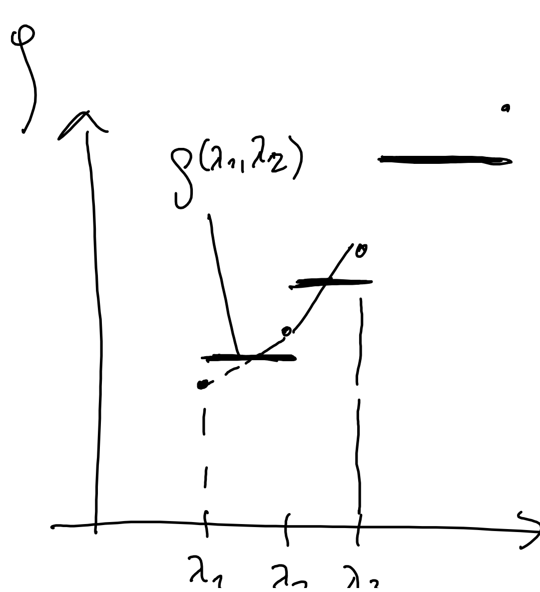
	λ_1	λ_2	λ_3	λ_4		λ_n
λ	300	310	320	330	....	2500
τ	0	0.05	0.1	0.2	...	0
ρ	1.	0.95	....			1
α						

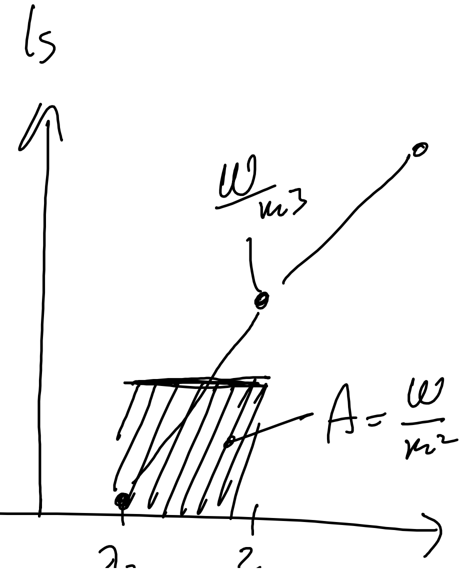


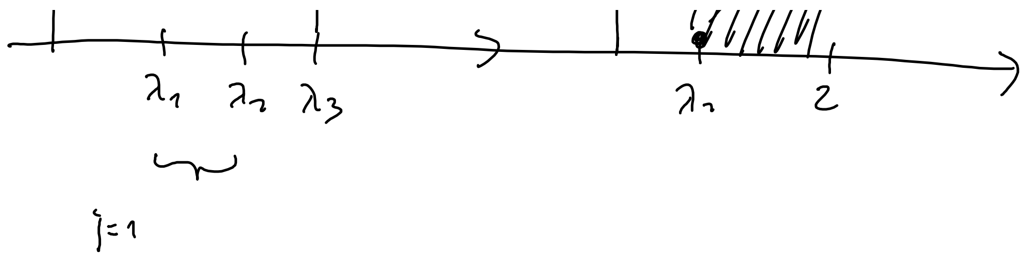


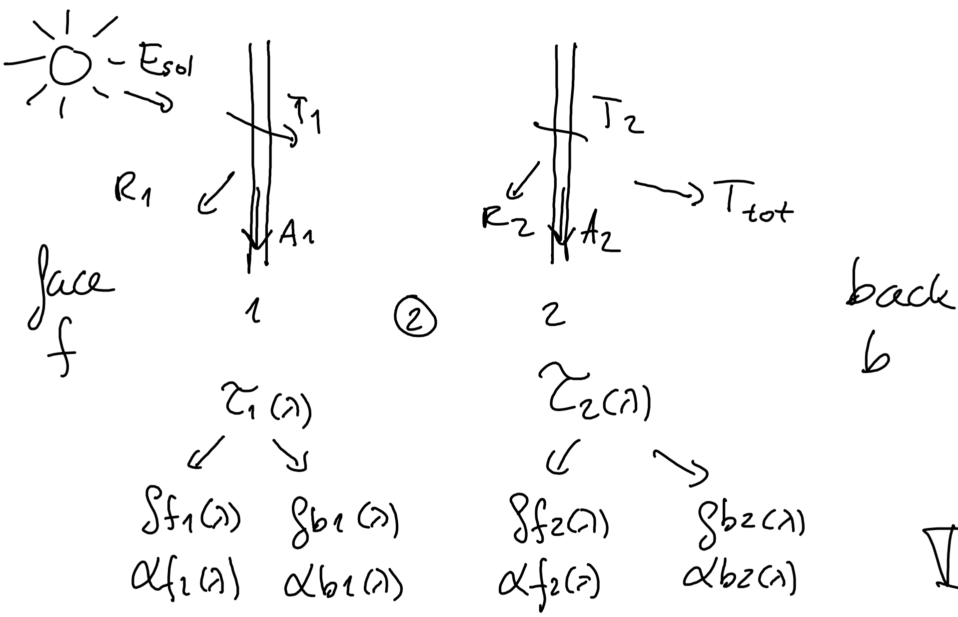
$$R = \frac{\int_{\lambda_1}^{\lambda_2} \rho(\lambda)\, s(\lambda)\, d\lambda}{\int s(\lambda)\, d\lambda} = \frac{\sum_{i=1}^{N-1} \ldots}{\ldots}$$

$$A = \frac{\int_{\lambda_1}^{\lambda_1} \alpha(\lambda)\, s(\lambda)\, d\lambda}{\int s(\lambda)\, d\lambda}$$







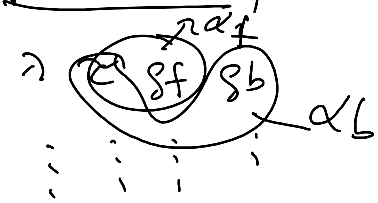


SGG Planitherm Ultra-N

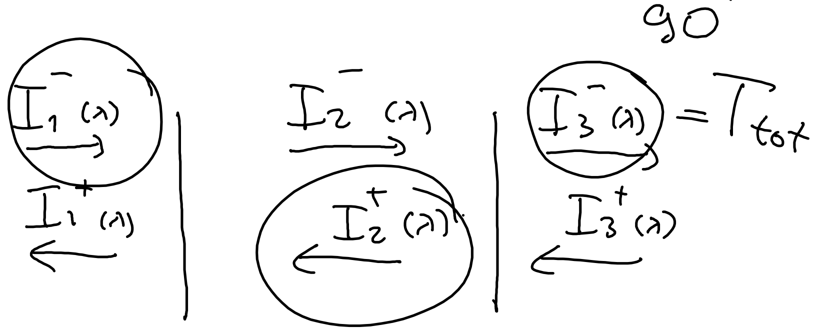
International Glazing Databes

IGDB

IGDB 1D



go:



$$\boxed{I_1^-(\lambda) = S(\lambda)}$$

$$I_2^-(\lambda) = \tau_1(\lambda)\cdot I_1^-(\lambda) + \rho_{b1}(\lambda)\, I_2^+(\lambda)$$

$$I_3^-(\lambda) = \tau_2(\lambda)\cdot I_2^-(\lambda) + \rho_{b2}(\lambda)\, I_3^+(\lambda)$$

$$I_1^+(\lambda) = \tau_1(\lambda)\cdot I_2^+(\lambda) + \rho_{f1}(\lambda)\, I_1^-(\lambda)$$

$$I_2^+(\lambda) = \tau_2(\lambda)\cdot I_3^+(\lambda) + \rho_{f2}(\lambda)\, I_2^-(\lambda)$$

4 egyenlet

4 ismeretlen

✓

$$\boxed{I_3^+(\lambda) = \varnothing}$$

I_2^- I_3^-

$$\boxed{I_3^+(\lambda) = \emptyset}$$

I_2^- I_3^-

I_1^+ I_2^+

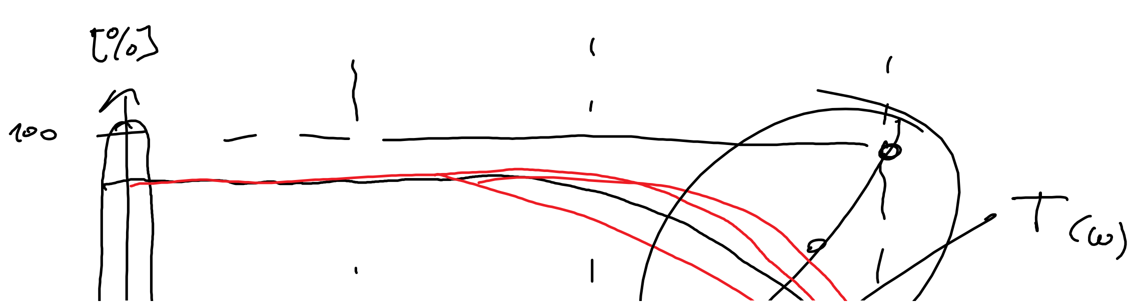
$$T_{tot} = \frac{\int_{\lambda_1}^{\lambda_2} I_3^-(\lambda)\, d\lambda}{\int_{\lambda_1}^{\lambda_2} I_1^-(\lambda)\, d\lambda} = \frac{\text{áteresztett}}{\text{összes}}$$

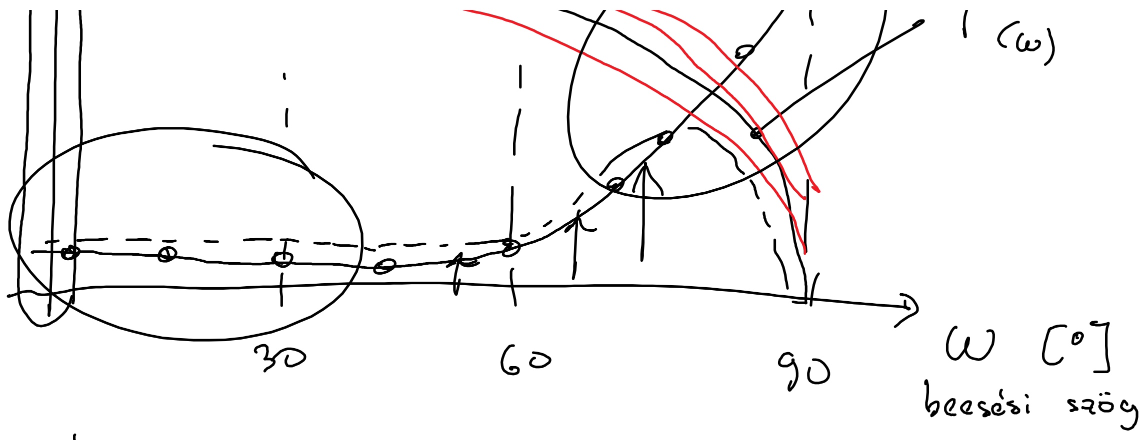
$$A_1 = \frac{\int_{\lambda_1}^{\lambda_2} \left(I_1^-(\lambda) + I_2^+(\lambda) - I_1^+(\lambda) - I_2^-(\lambda) \right) d\lambda}{\int_{\lambda_1}^{\lambda_2} I_1^-(\lambda)\, d\lambda}$$

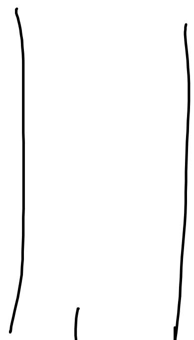
$$A_2 = \frac{\int_{\lambda_1}^{\lambda_2} \left(I_2^-(\lambda) + I_3^+(\lambda) - I_3^-(\lambda) - I_2^+(\lambda) \right) d\lambda}{\int_{\lambda_1}^{\lambda_2} I_1^-(\lambda)\, d\lambda}$$

$$A_1 + A_2 + T_{tot} + Rf_1 = 1$$

$$\sum_{i=1}^{n} A_n + T_{tot} + Rf_1 = 1$$

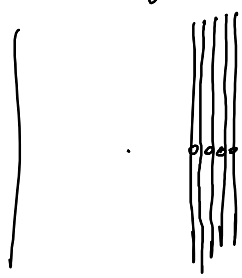






optikai fel.

$\tau(\omega) = f(\text{optikai fel.}, \omega)$



$\tau(\omega) = g_{fo.} \cdot \tau(90)$

üveg típusra korreláció

- $\lambda = \lambda_1 \dots \lambda_n$
  - $\omega = 0 \dots 90$ $\omega = 1$ $g = 1$

    adott üveg $\tau(\omega,\lambda) = ? = g \cdot \tau(90,\lambda)$

    $\alpha(\omega,\lambda)$

    $\rho(\omega,\lambda)$

    egyenletrendszer megold

    → ...

  → ...

A_1

1 kappája + geom

A_1 $\cancel{\omega}$

.. $\cancel{\omega}_1$

.. $\cancel{\omega}_1 \leftarrow$

... ω_3

... ω_4

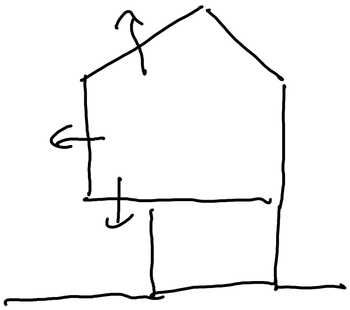
(1) kappája + geom

→ beesési szög

→

02 - konvektív hőátadás

2016. október 20.
18:38



h	←	↑	↓
benn	8	10	6
kinn	25	25	25

$$h = h_{conv} + \boxed{h_{rad}} \qquad [W/m^2K]$$

$$h_{rad} \cong 4\sigma \cdot \varepsilon \cdot T_m^3 \qquad T_m \cong \frac{T_s + T_{MET}}{2}$$

hőtranszport folyadékokban → termikus diffúzió $q = -\lambda \nabla T$

→ konvekció → természetes áramlás

→ kényszer áramlás

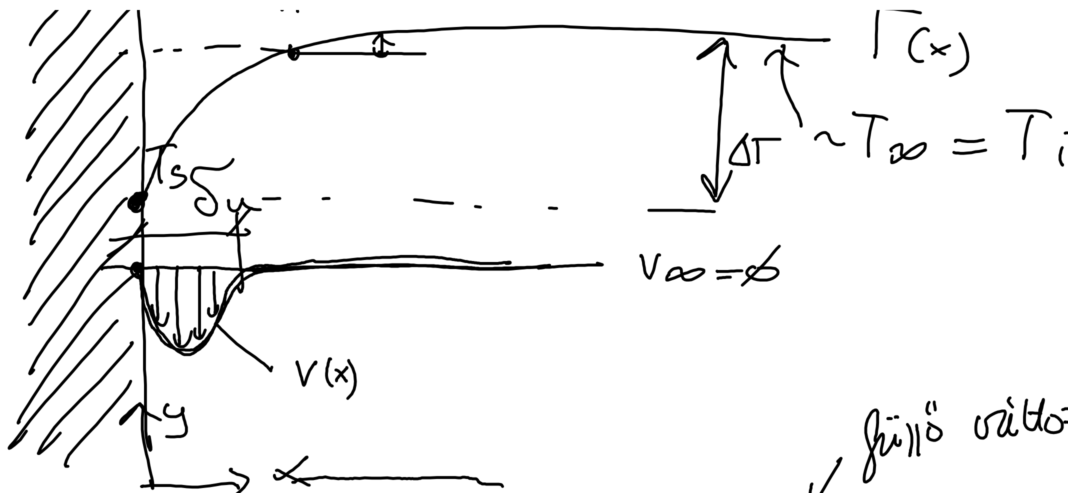
$$\boxed{\frac{\partial \rho c_p T}{\partial t} + \cancel{\frac{\partial}{\partial x}(c_p \rho T \cdot u)} + \cancel{\frac{\partial}{\partial y}(c_p \rho T \cdot v)} + \cancel{\frac{\partial}{\partial z}(c_p \rho T \cdot w)} = \nabla(\lambda \nabla T) + \dot{q}}$$

V - sebességtér

vektortér

u, v, w

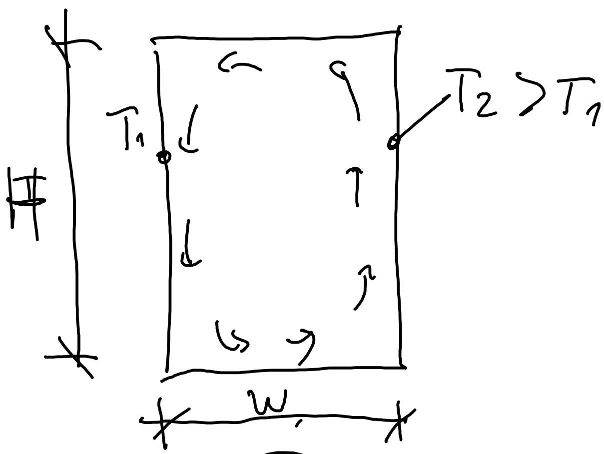
$x \quad y \quad z$



függő változó

$$h_c = ? = f(w, H, g, \rho, c_p, \lambda, \mu, \Delta T, \beta)$$

független változók



hossz L

tömeg M

idő t

hőmérs. T

W ·
H ·
ρ ·
cp ·
λ ·
μ ·
ΔT ·
β ·
~~g~~ ·

$n = 4$

$9 - n = 5$

4

$$\boxed{1 = f(3)}$$

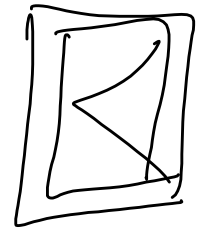
Nusselt szám

$$Nu = \frac{\text{konvektív hőátad. tényező}}{\text{konduktív —"—}} = \frac{h_{conv}}{h_{cond}} = \frac{h_{conv}}{\frac{\lambda}{W}} = \boxed{\frac{h_{conv} \cdot W}{\lambda}}$$

$$\frac{\frac{W}{m^2K} \cdot m}{\frac{W}{mK}} \quad [-]$$

$$\frac{\frac{W}{\cancel{m^2K}}}{\frac{W}{\cancel{mK}}} \quad [-]$$

LBNL	WINDOW
″	OPTICS
″	THERM



e.g

....

2016. október 21.
12:29

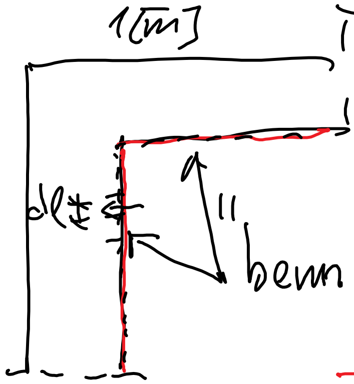
$$\frac{\frac{1}{\Delta T}\int_{\text{"benn"}} q\,dl}{\text{length}}$$

//

U factor $\Longrightarrow$ L_{2D} [W/K]

custom length = 1000 mm

" 1[m]



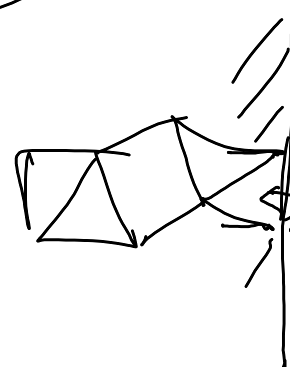
– U factor surface tag

$$\sum_{i=1}^{n} q_{n,i}\, dl_i \cdot 1m$$

$$\|$$

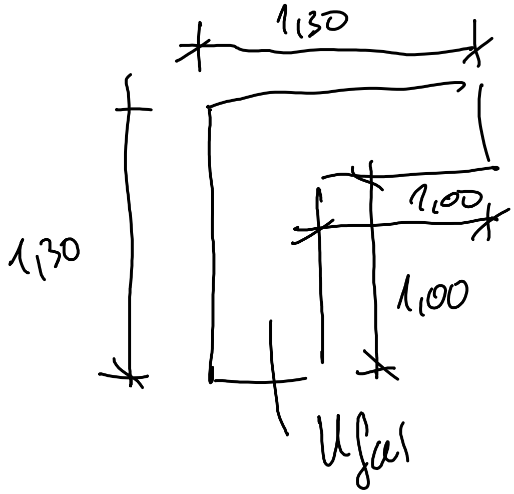
$$\boxed{\text{U-factor}} = \underbrace{\frac{1}{\Delta T}\int_{\text{'tag'}} q\,dl}_{L_{2D}} \Big/ \cancel{\text{length}}$$

length = 1



$\Psi_i = (L_{2D} \ldots)(\Sigma U_i l_i$

$$\Psi_i = L_{20} - \sum U_i \cdot l_i$$



$$\Psi_i = L_{20} - U_{fal.} \cdot 2m \quad \left[\frac{W}{mK}\right]$$

$$\Psi_e = L_{20} - U_{fal.} \cdot 2{,}6\,m \quad \left[\frac{W}{mK}\right]$$