1. In order to calculating the heat trander reat between two parallel plates.

2. With shields n, I want to calculate the heat trander reat.

~~3. When each parallel~~ p

3. When each parallel plates have the same value of emissivity, I want to calculate the heat trander rate

Task I:

Define the radiative heat transfer between two parellel plates in the presentation picture.

$$q_{net1-2} = \frac{\dot{Q}_{net1-2}}{A} = \frac{A\sigma(T_1^4 - T_2^4)}{(\frac{1}{\varepsilon_1}+\frac{1}{\varepsilon_2}-1)*A}$$

$$= \frac{(5.67\times10^{-8}) * (800^4 - 500^4)}{\frac{1}{0.1}+\frac{1}{0.1}-1}$$

$$\approx 1035.82\ W/m^2$$

The new heat transfer heat should be 1% of the q_{net1-2}

i.e., $q'_{net1-2} = \frac{1}{100} \times q_{net1-2}$

$$q_{net1-2,\ n\,shiels} = \frac{\dot{Q}_{net1-2,\ n\,shields}}{A}$$

$$= \frac{\sigma(T_2^4 - T_1^4)}{[(\frac{1}{\varepsilon_1}+\frac{1}{\varepsilon_2}-1)+(\frac{1}{\varepsilon_{3,1}}+\frac{1}{\varepsilon_{3,2}}-1)+\cdots n] * A}$$

Autem, $\varepsilon_1 = \varepsilon_2 = \varepsilon_3 = \cdots = \varepsilon_n = 0.1$

Substitute $\varepsilon = 0.1$ for $\varepsilon_1, \varepsilon_2, \varepsilon_3, \ldots \varepsilon_n$ and introduce to aquation:

$$q_{net1-2,\ n\,shiels} = \frac{\sigma(T_2^4 - T_1^4)}{(n+1)(\frac{1}{\varepsilon}+\frac{1}{\varepsilon}-1)} = \frac{1}{n+1} * \frac{\sigma(T_2^4 - T_1^4)}{(\frac{1}{\varepsilon}+\frac{1}{\varepsilon}-1)}$$

Since i.e., $q'_{net1-2} = \frac{1}{100} \times q_{net1-2}$

$$= \frac{1}{100} * \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\varepsilon}+\frac{1}{\varepsilon}-1}$$

draw a conclusion $n = 99$

To have the new heat transfer rate to be 1% of the case without shields.

We need 99 shields which $\varepsilon = 0.1$