WEEK 5

Task 2 Solve the last example you solved in the class (radiative heat exchange between two parallel plates) awhile considering the two emissivities to be 0.1, what can you conclude from the result?

A1=1.5m2
$\epsilon 1=0.1$
$\epsilon 2=0.1$
T1= 298 K,
T2 = 308 K
$\sigma=5.67 * 10-8 \mathrm{Wm2\ K4}$.

According to the formula,

$$Q.net_{2-1} = \frac{A\sigma(T_2{}^4 - T_1{}^4)}{1/\epsilon_2 + 1/\epsilon 1 - 1}$$

$$Q.net_{2-1} = \frac{1.5m2 \times (5.67 \times 10^{-8}\ Wm2\ K^4) \times (308^4 - 298^4) K^4}{1/0.1 + 1/0.1 - 1}$$

$$= 4.9823\ W$$

Meanwhile, under situation, based on the following formula

$$F_{2-1} = \frac{1}{1/\epsilon_2 + 1/\epsilon_1 - 1}$$

$$= \frac{1}{1/0.1 + 1/0.1 - 1}$$

$$= 0.0526$$

when $F_{1-2} = 0.01$

$$Q.net_{1-2} = AF_{1-2}\sigma(T_2{}^4 - T_1{}^4)$$
$$= 1.5m_2 \times 0.01 \times (5.67 \times 10^{-8}\ Wm_2\ K^4) \times (298^4 - 308^4) K^4$$
$$= -0.9466\ W$$

$$\therefore Q.net_{2-1} = -Q.net_{1-2} = 0.9466\ W$$

The radiative heat exchange between the surfaces will be affect by the value of emessivity