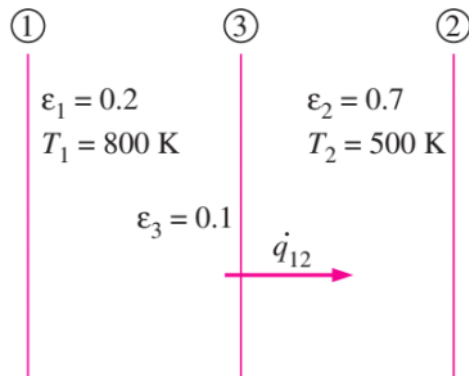


# Week6-hulinxue1

Task 1 Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with epsilon = 0.1 should you add in order to have the new heat transfer rate to be 1% of the case without shields ?



$$\dot{Q}_{12n \text{ shield}} = \frac{1}{n+1} \dot{Q}_{12 \text{ no shield}}$$

$$\frac{1}{n+1} = 1\% = 0.01$$

$$n=99$$

$$\dot{Q}_{12, N \text{ shields}} = \frac{A\sigma(T_1^4 - T_2^4)}{\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1\right) + \left(\frac{1}{\varepsilon_{3,1}} + \frac{1}{\varepsilon_{3,2}} - 1\right) + \cdots + \left(\frac{1}{\varepsilon_{N,1}} + \frac{1}{\varepsilon_{N,2}} - 1\right)}$$

$$\dot{Q}_{12, N \text{ shields}} = \frac{A\sigma(T_1^4 - T_2^4)}{(N+1)\left(\frac{1}{\varepsilon} + \frac{1}{\varepsilon} - 1\right)} = \frac{1}{N+1} \dot{Q}_{12, \text{ no shield}}$$