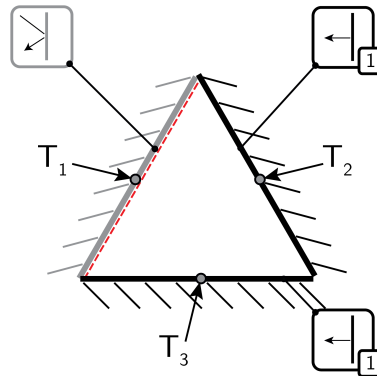


Surface Brightness 18

Determine the surface brightness \dot{Q}_1 . Use view factors and other surface brightnesses whenever possible.



Definition of the surface brightness:

$$\dot{Q}_1 = \dot{Q}_{1,\epsilon} + \dot{Q}_{1,\rho} + \dot{Q}_{1,\tau}^0$$

Defining the emitted, reflected and transmitted radiation:

The emitted radiation of a grey body radiator can be stated as:

$$\dot{Q}_{1,\epsilon} = \epsilon_1 \sigma A_1 T_1^4$$

The reflected radiation can be expressed by the reflection coefficient and the radiation being transferred toward the body:

$$\dot{Q}_{1,\rho} = \rho_1 \left(\Phi_{21} \dot{Q}_2 + \Phi_{31} \dot{Q}_3 \right)$$

Inserting and rewriting:

$$\Rightarrow \dot{Q}_1 = \epsilon_1 \sigma A_1 T_1^4 + \rho_1 \left(\Phi_{21} \dot{Q}_2 + \Phi_{31} \dot{Q}_3 \right)$$