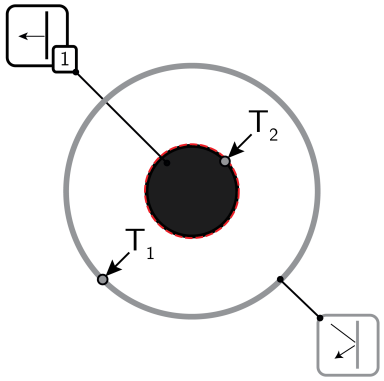
EB - Rad. - Net 01

Write the net heat flux between object 1 and object 2. $\dot{Q}_{1\leftrightarrow 2}$. Use view factors and surface brightness whenever possible.



Definition of the net heat flux:

$$\dot{Q}_{1\leftrightarrow 2} = \Phi_{12}\dot{Q}_1 - \cancel{\Phi_{21}}^{1}\dot{Q}_2$$

Heat fluxes:

The surface brightnesses of bodies 1 and 2 will be determined in a separate task and can be stated as $\dot{Q}_1$ and $\dot{Q}_2$ respectively.

The emitted radiation of body 1 by use of the emission coefficient, which is equal to one for a black body radiator, and the Stefan-Boltzmann law:

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

Substituting and rewriting:

$$\dot{Q}_{1\leftrightarrow 2} = \Phi_{12}\dot{Q}_1 - \dot{Q}_2$$