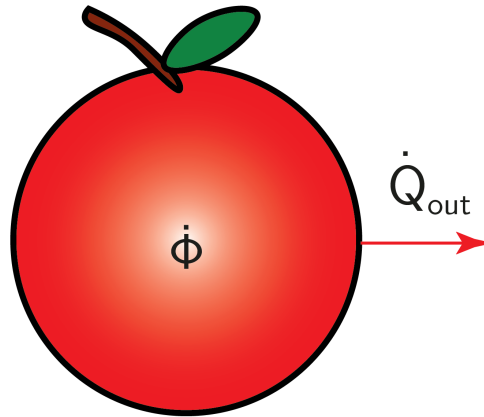# EB - Cond. - Body 4

Specify the energy balance to obtain the homogeneous temperature T_{w} of the sphere. Assume steady-state conditions.

Energy balance:

$$\dot{\Phi} - \dot{Q}_{out} = 0$$

Since the type of heat transfer is steady-state, the sum of the in- and outgoing heat fluxes of the control volume should equal zero.

Heat fluxes:

$$\dot{\Phi} = \dot{\Phi}''' \cdot \tfrac{4}{3} \cdot \pi \cdot R^3$$

$$\dot{Q}_{out} = \alpha \cdot 4 \cdot \pi \cdot R^2 \cdot (T_w - T_\infty)$$