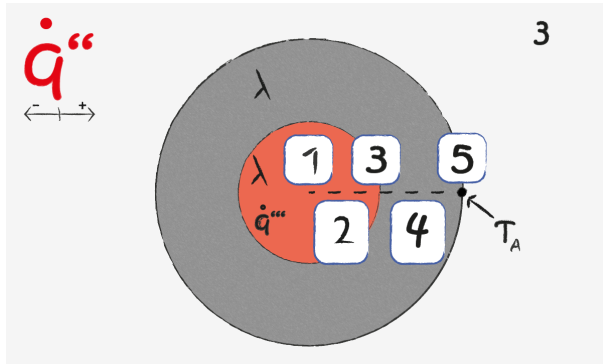


## Axial Heat Flux: Task 3



The image describes a cylindrical body of infinite expansion. The inner compartment has a heat source. The conductivity of the outer material is constant.

1



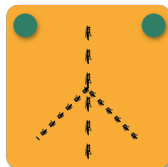
Due to symmetry reasons, the specific heat flux at the pipe's center is zero.

2



The volumetric heat source causes the specific heat flux to increase linearly.

3



The transition is marked by a kink in specific heat flux, since from there on increasing area causes the specific heat flux to decrease.

4



Linear increase of area goes along with decrease of specific heat flux proportional to  $\frac{1}{r}$ . Thermal conductivity is not of interest for the heat flux profile.

5



To fulfill the energy balance in a steady case, the specific heat flux is still positive at the boundary, indicating a flux from inside to outside.