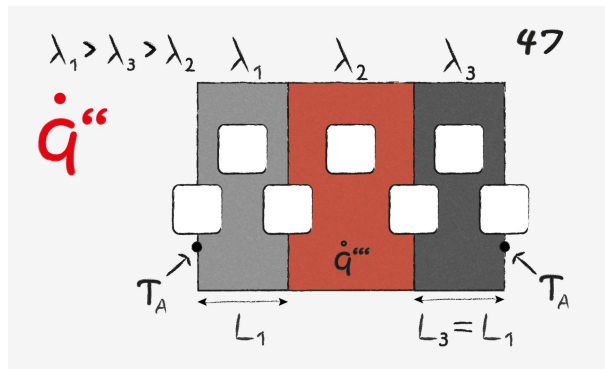


Axial Heat Flux: Task 47



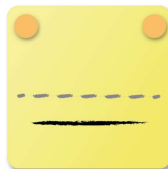
The image describes a wall consisting of three sections with different thermal conductivities. The central section contains a volumetric heat source. Length of section 1 and 3 are equal, just as the ambient temperatures at the boundaries.

1



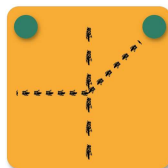
The heat source and equal ambient temperatures are indicating that heat is conducted from section 2 to sections 1 and 3. Therefore the specific heat flux is negative at the left boundary.

2



In section 1 neither heat sources/sinks cause a change in heat flux, nor does the cross section area change. That is specific heat flux is constant.

3



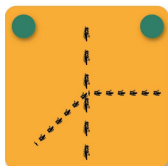
The transition is marked by a kink in specific heat flux, since heat is produced in section 2.

4



The volumetric heat source leads to a linear increase of specific heat flux. Since heat is also conducted to section 3, the profile crosses the axis in this section.

5



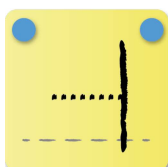
The transition is characterized by another kink, caused by the end of the heat source.

6



Specific heat flux remains constant for the same reasons as in section 1 ...

7



... and does so all the way to the boundary of section 3. Different thermal conductivities have no direct effect of the profile's shape. However they determine to which fraction the produced heat is conducted in section 1 and section 3. This influence can not be expressed via the tiles given in this task and is therefore irrelevant for the solution in this format.