Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Student number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Assignment 2**

*X,x*

*L*

*Y,y*

1

2

3

*L*

Consider the temperature distribution in the structure shown which is composed of one triangle element. Assuming that the thermal conductivity and thickness *t* of the element are constants, derive the element contribution . Temperature at nodes 1 and 2 is known to be  and the unknown nodal temperature is .

**Solution template**

In stationary thermo-elasticity, the variational densities of the thin slab mode of the plate model

, 

represent the energy balance. Linear shape functions of the temperature approximation can be deduced from the figure

, , .

Approximation to  and its variation  (notice that the variation of a given quantity vanishes)

, , ,

, , .

When the approximation is substituted there, the variational density simplifies to

.

Integration over the element gives

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