5/11-16

Finite element project

# Abstract

# ~~INtroduction~~

## ~~Heat sinks~~

## ~~Hypothesis~~

# Theory

## Heat equation with Robin boundry and Dirichlet

### Stationary

## Derivation of the system (1-7)

## Prove a(.,.) is positive definite

## Why is A singular before boundary conditions

### The solution is not unique => A not invertible

## Barycentric coordinates

# Numerical implementation

## Linear basis function

## ~~Gmsh~~

### ~~Mesh factor~~

### ~~Smoothing~~

### ~~Physical group~~

## Jabobian

## Using quadrature2D in 3D.

## Enforcing boundary conditions

### Dirichlet

### Robin

## Problems with the mesh considering very thin fins.

## Why we can’t use sparse matrixes in the program

### The matrix need to be updated.

# Results and discussion

## Glview

## Cutting planes vs iso-surface

## Physical interpretation

### Heat transfer coefficient uncertainty

### What does Dirichlet boundry on the bottom mean?

#### Is it realistic? What about Neumann instead?

### Why do the sinks with the same height but different numbers of fins have the same temperature?

## The total heat flux of the short with 8 fins is higher than the tall one with 4 fins high because the area is the same, but the temperature in former is higher

## Fins close to each other; the model doesn’t take this into account

### Is heat radiation significant

### What about the air temperature as it flows past the fins?

# Conclusion

## Further improvements

### Brick prism elements for thin fins

### Neumann instead of Dirichlet