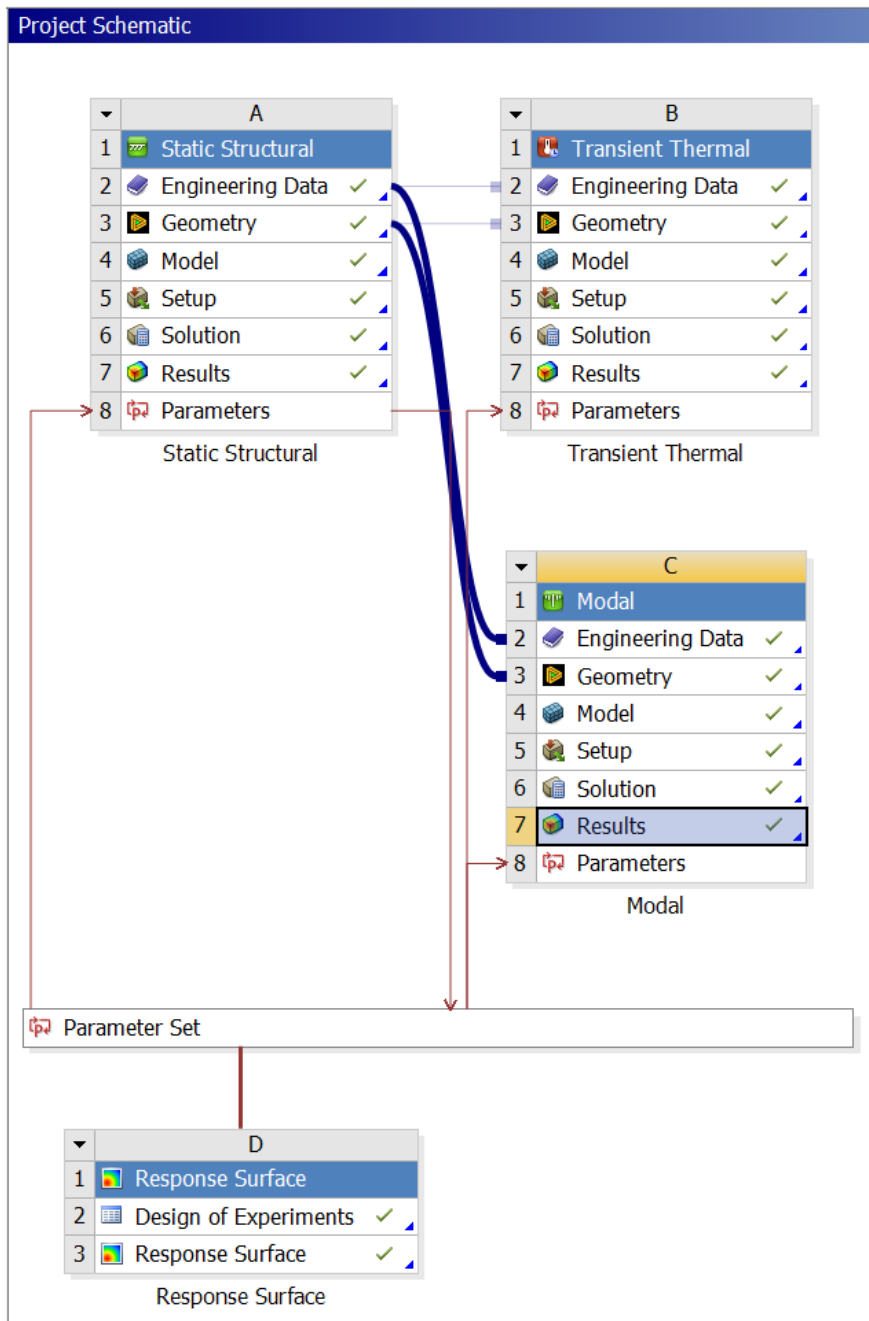


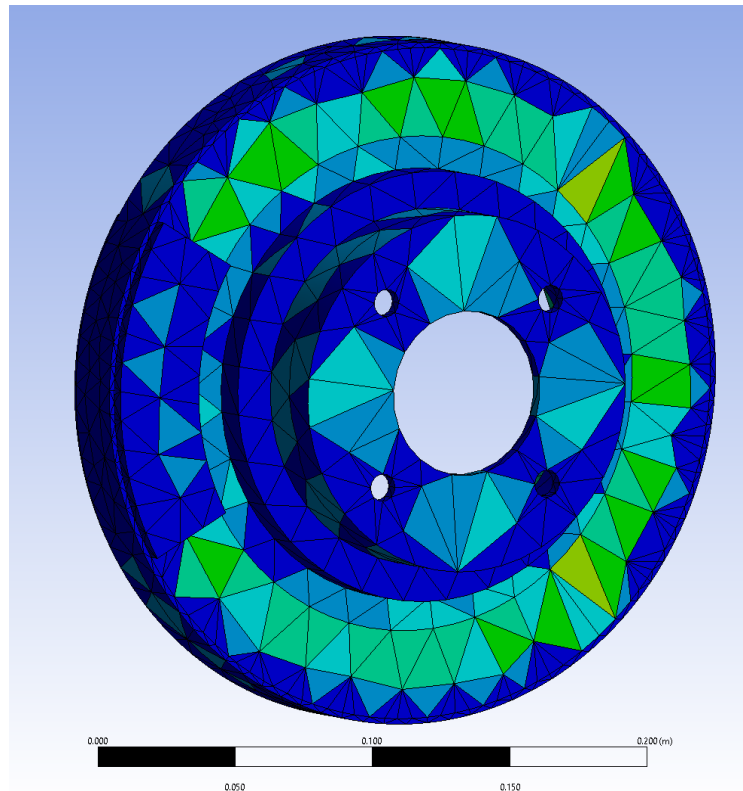
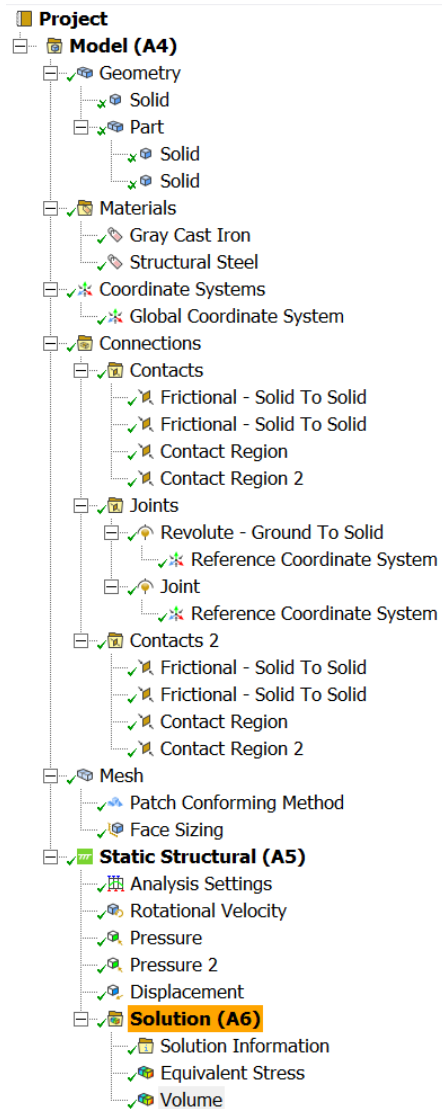
# ANSYS DOE and Design Optimization

The objective of the project is to utilize the Ansys design of the experiment (DOE) and optimization tools to optimize the design of a brake engineering model.

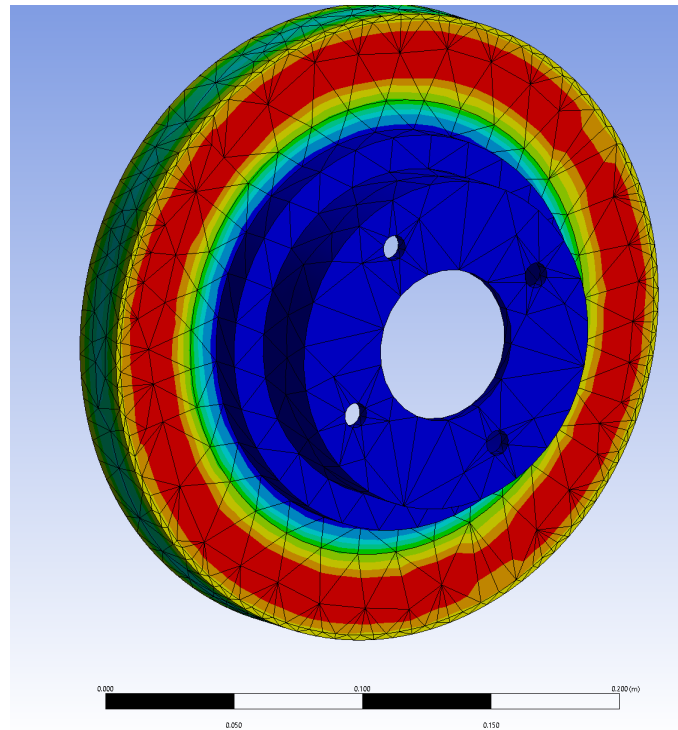
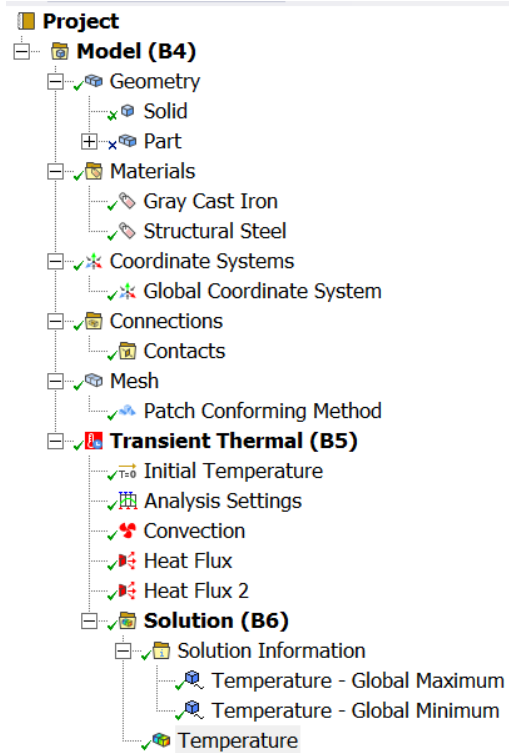
## Project schematic



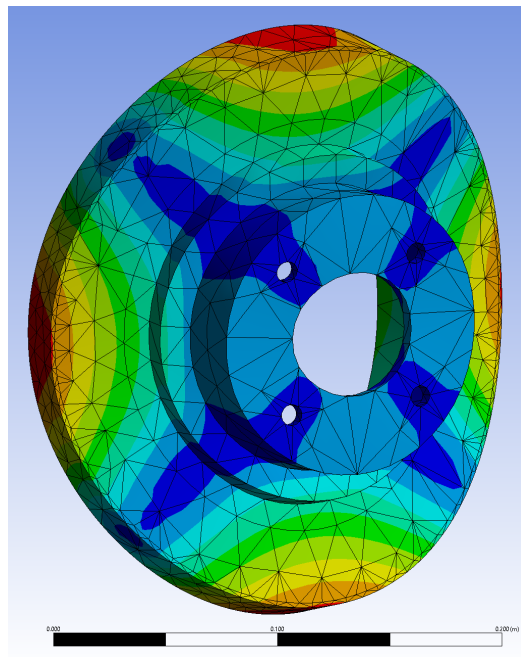
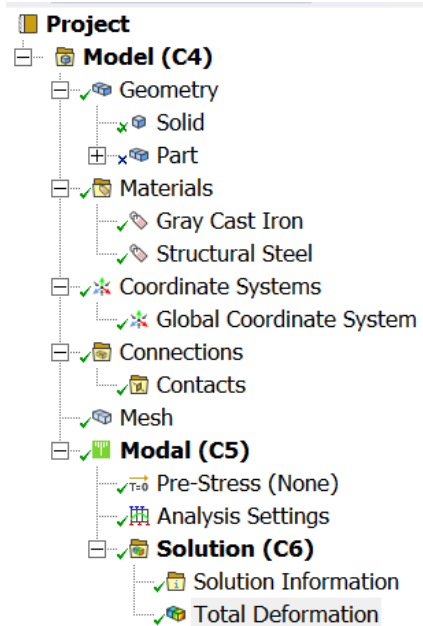
# Static structural setup



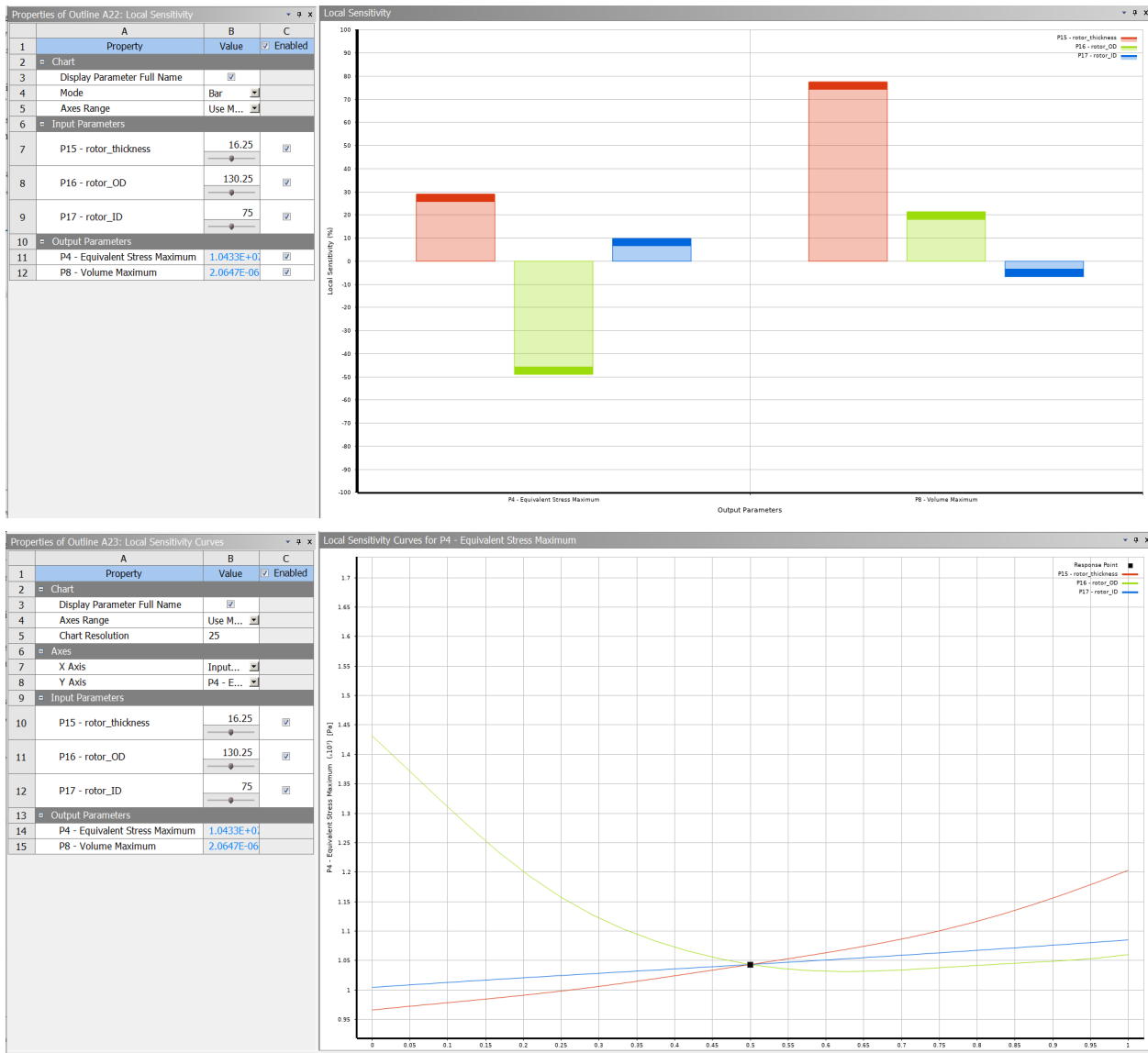
# Modal setup



# Transient thermal setup



# Sensitivity Analysis

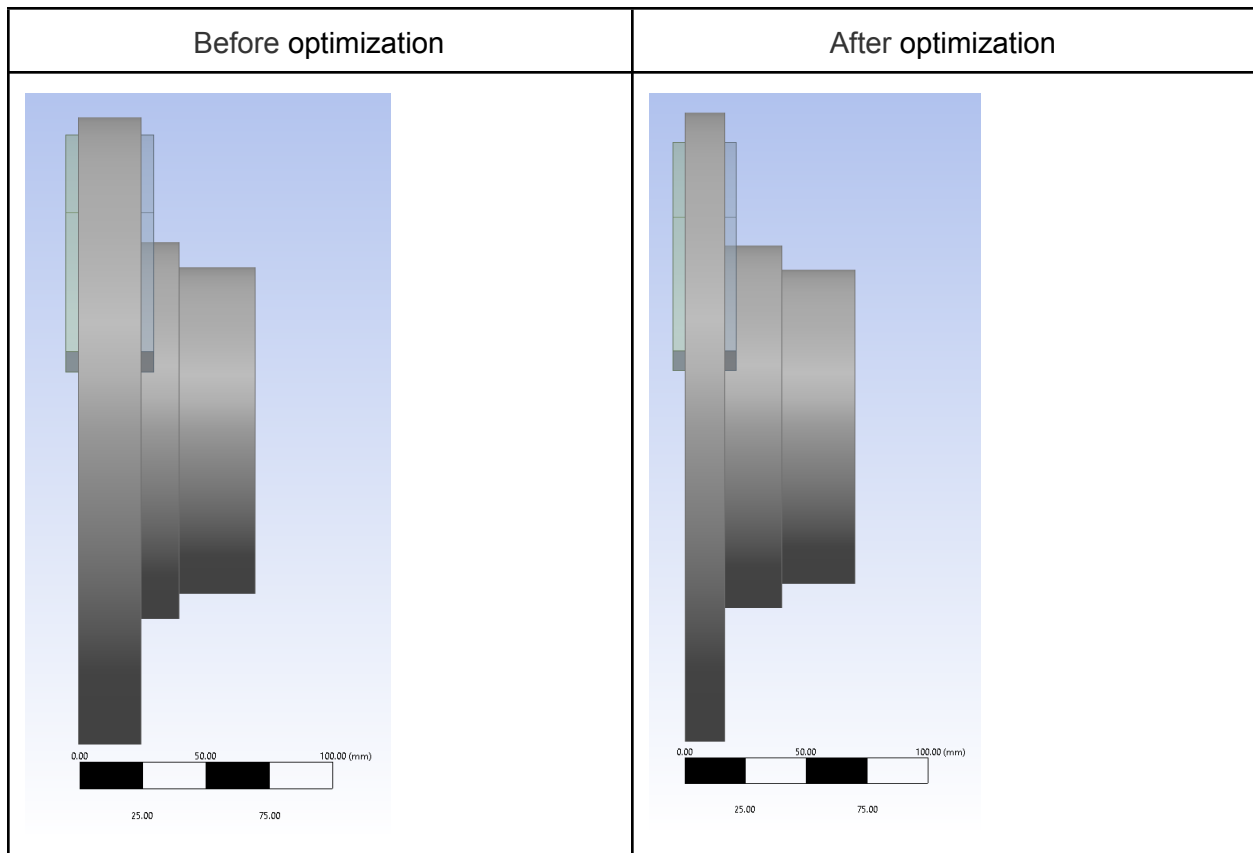


## Encountered problem and solution

During the simulation step of the experiment, an error of failing to update the design point occurred. In the beginning, the professor has suggested deleting the design points which failed to update. However, the problem still persists after deleting the design points which failed to update. After consulting the professor again, it turns out that the lower bound of the outer diameter caused the disk to be too small which results in the contact surface of the pad and the disk changing. After trying different parameters in the DesignModular a value of the lower bound has been determined and applied to the setting. Applying new boundaries has eliminated errors during the simulation.

## Optimization result

	Rotor thickness (mm)	Rotor outer diameter (mm)	Rotor inner diameter (mm)	Volume (mm <sup>3</sup> )
Before optimization	25	125	75	9.97e+05
After optimization	16.25	130.25	75	7.09e+05



There is a 28.8867% decrease in disk volume after the optimization.