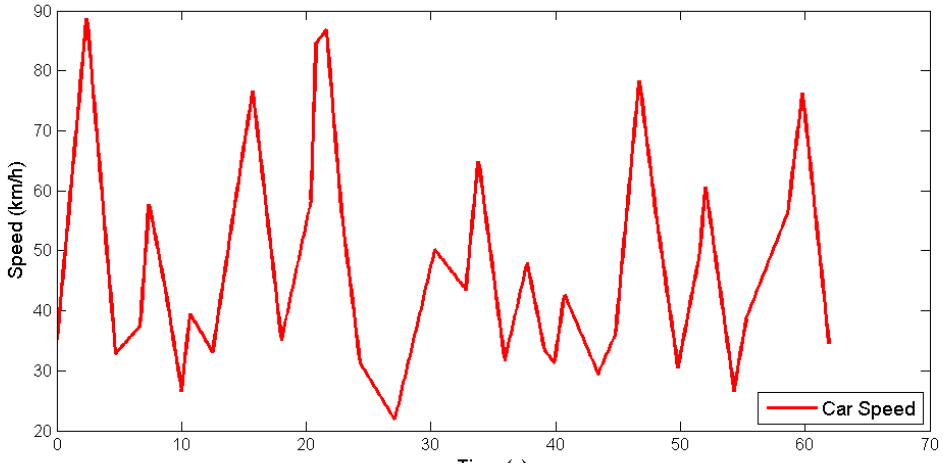
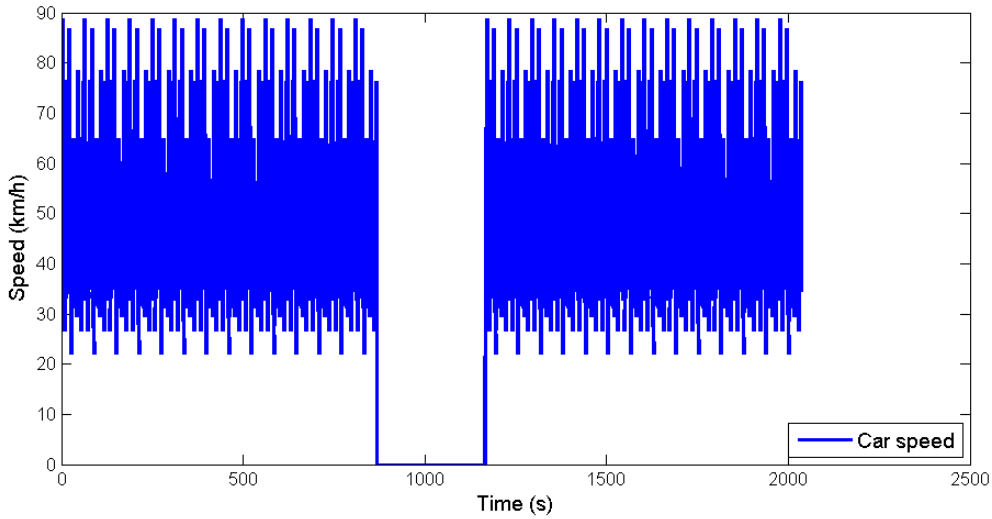
BRAKES THERMAL SIMULATION

Parametric model of the thermal evolution of the braking system:

- Vehicle features (mass, braking balance)
- Run features (circuit speed profile, stops)
- Brake system geometry (Discs, calipers, master-cylinders, disc hub)
- Brake system thermal features (Thermal capacity, conduction factor, emissivity)

➔ Maximum temperature of the discs depending on the speed profile
➔ Speed profile taken from a test track similar to FSUK track in terms of corners
➔ Simulation of an endurance run with a driver change break

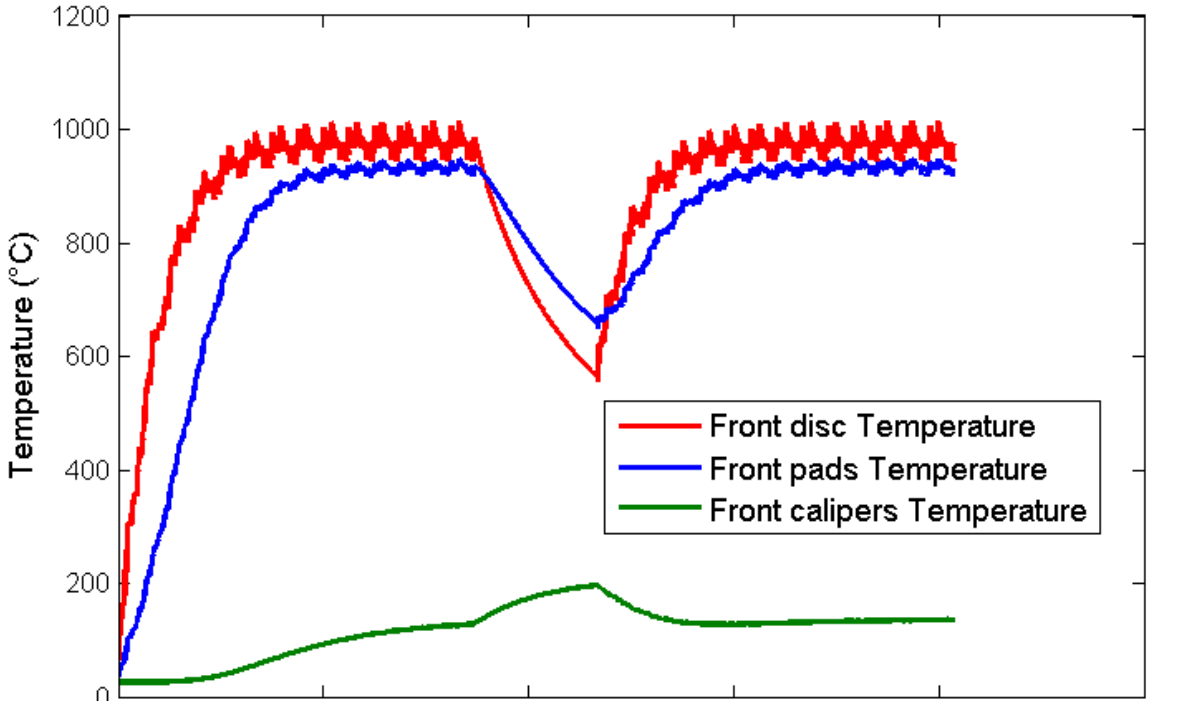


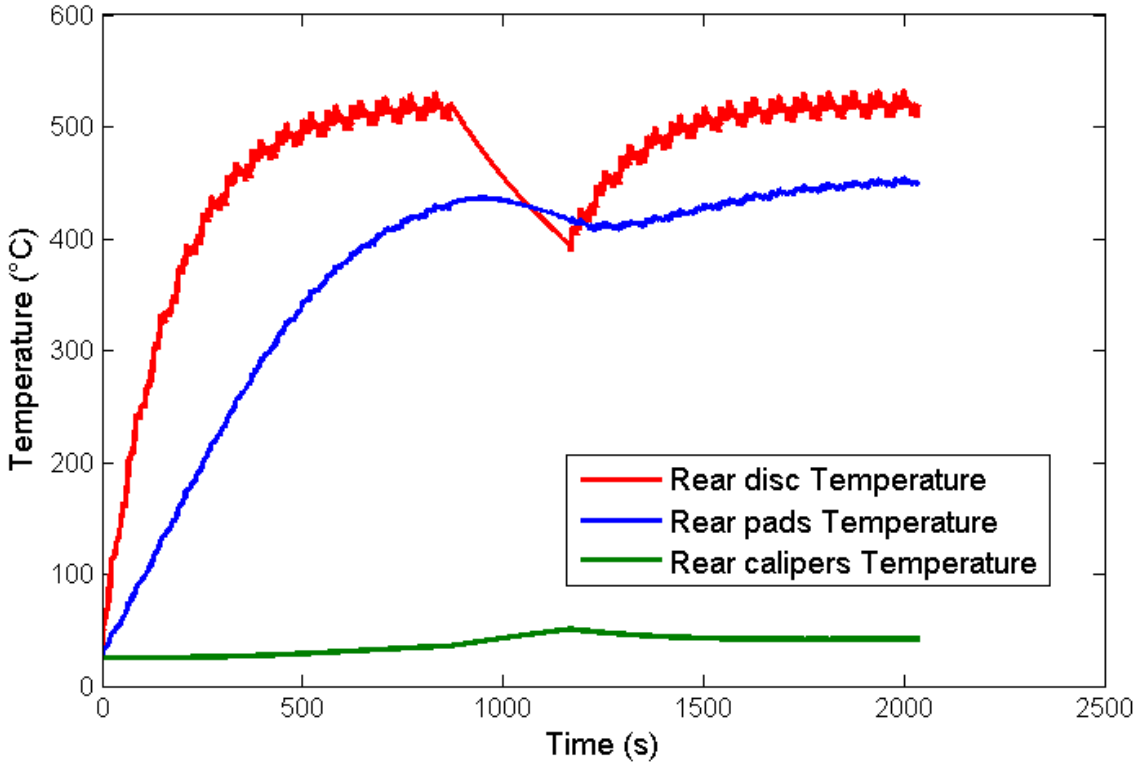


Convection factor formula :

$Nu = (0.036.Re^{0.8}.\mathrm{Pr})/(1 + 0.83.(Pr^{0.6} - 1)$ and $h = Nu.\frac{k_{air}}{D}$

Results:


Temperature (°C)
Front disc Temperature
Front pads Temperature
Front calipers Temperature


Temperature (°C)
Rear disc Temperature
Rear pads Temperature
Rear calipers Temperature
Time (s)

Comparison with a sportsbike at Losail Circuit (Qatar):

- Simulation with a Sportsbike with 4D Beringer braking system (4x230mm discs at front)
- Lap Speed profile recreated from informations on the internet (25 Laps simulation)