Results of Airfoil Simulations of Rear Wing of FS car

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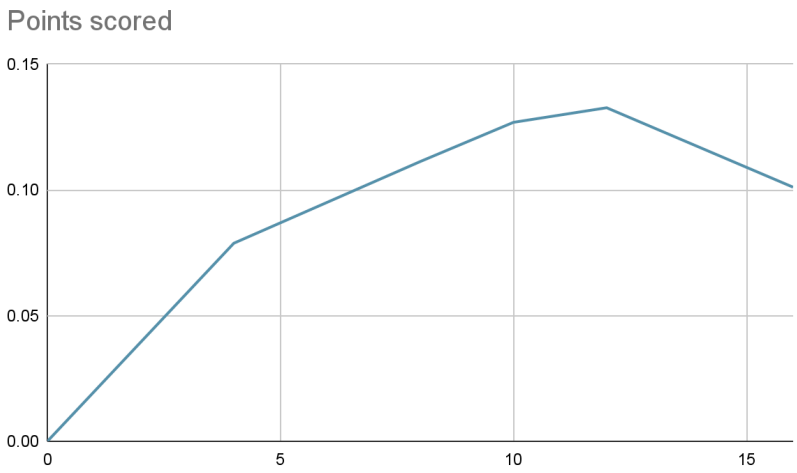
Reynolds number has been calculated from given flow conditions (80 kmph and L = 1 m), which comes out to be 1,564,574 has been equated for the used chord length and thus resulting velocity for L = 0.1 m of airfoils has been used.

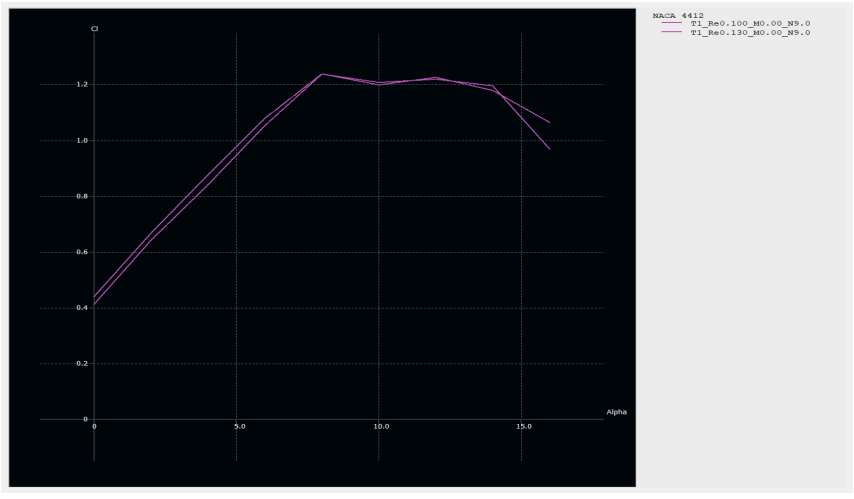
NACA 4412(pre- assigned)

<u>Cl vs AoA</u>

ANSYS results graph :

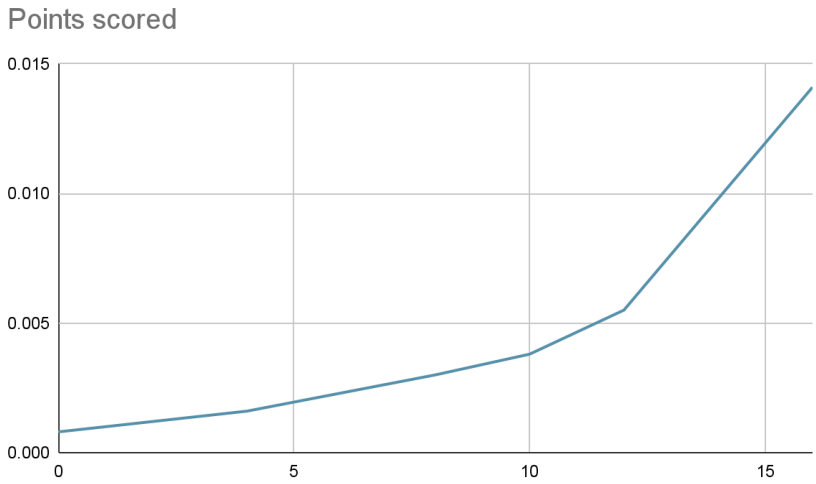


XLFR5 graph:

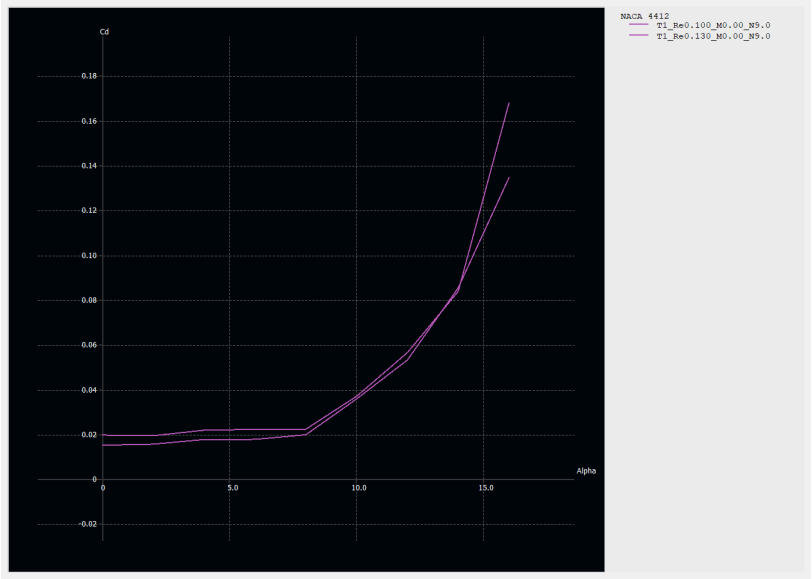


Cd vs AoA

ANSYS results graph :



Xlfr5 graph:

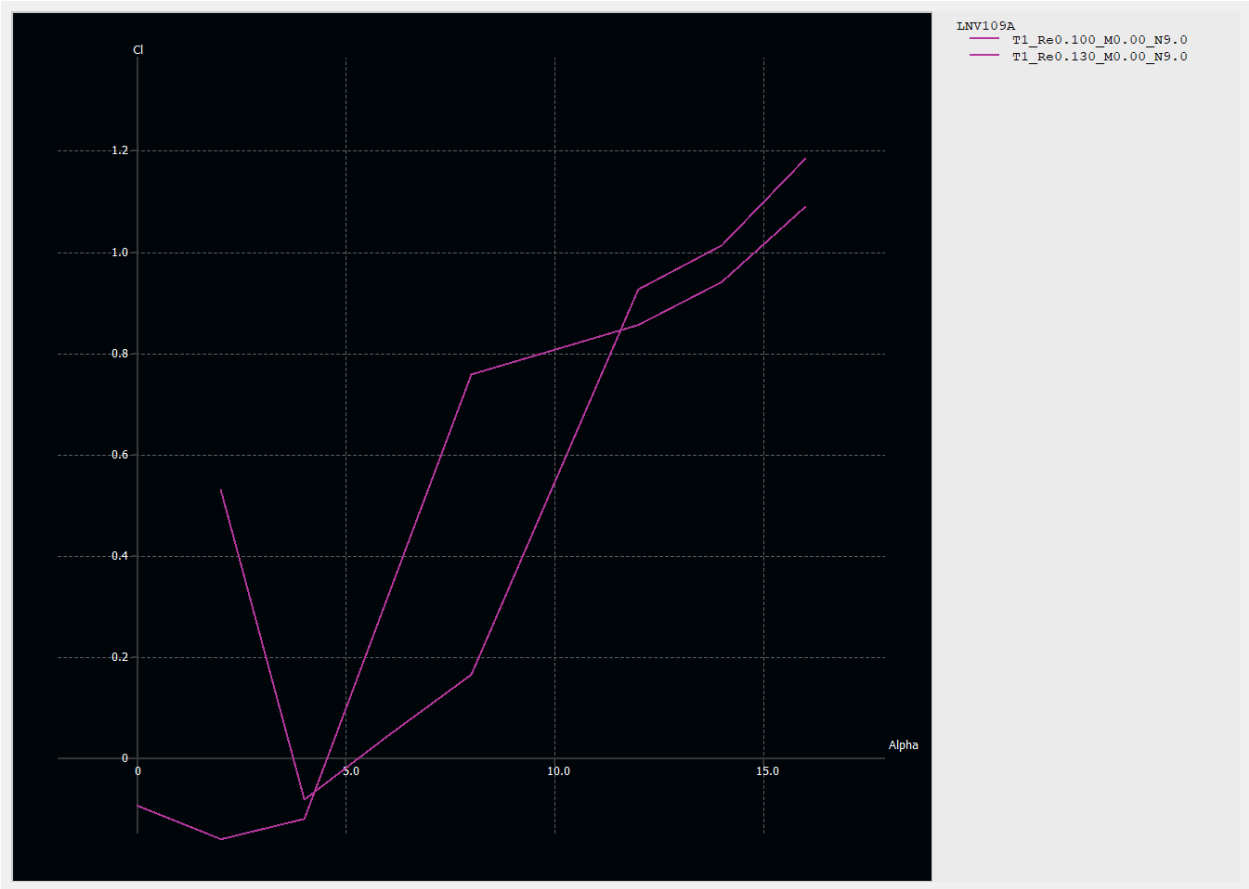


LNV109A (Motorsport Airfoil)

This airfoil was used for the rear wing in NASCAR, but they switched back to spoilers since it created too much lift.

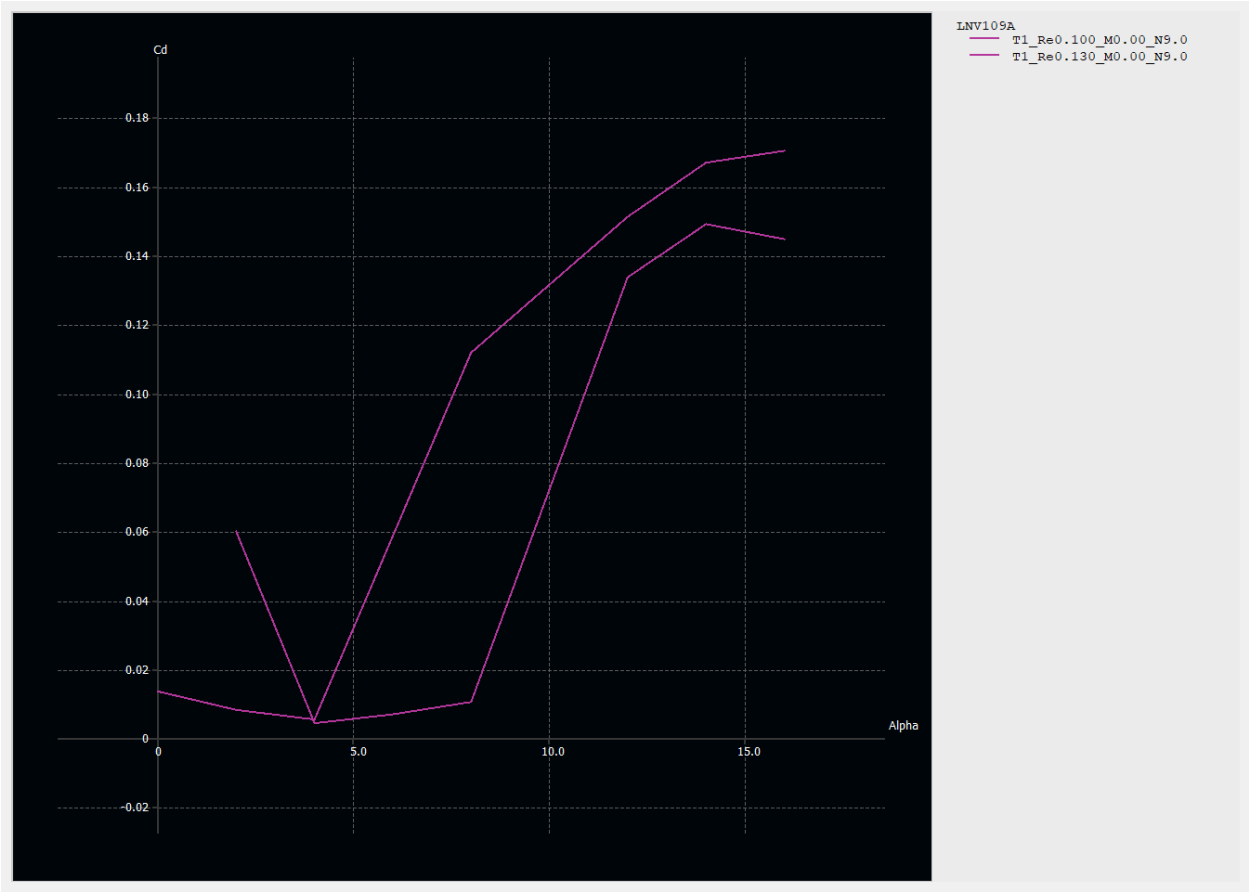
Cl vs AoA

XLfr5 graph:



Cd vs AoA

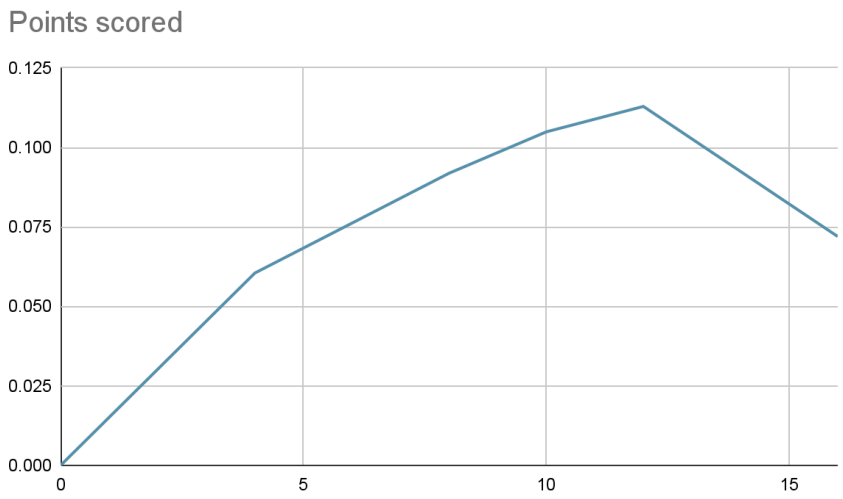
XLfr5 graph:



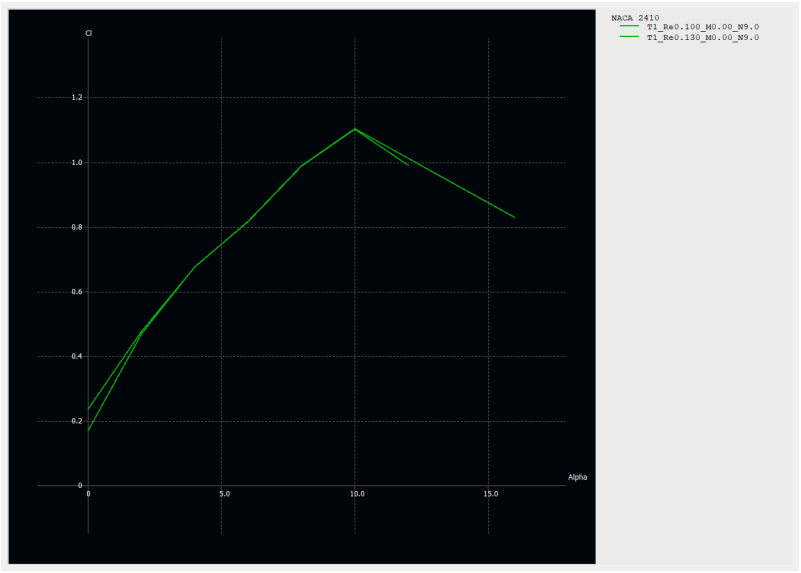
NACA 2410 (Random Airfoil)

Cl vs AoA

ANSYS results graph :

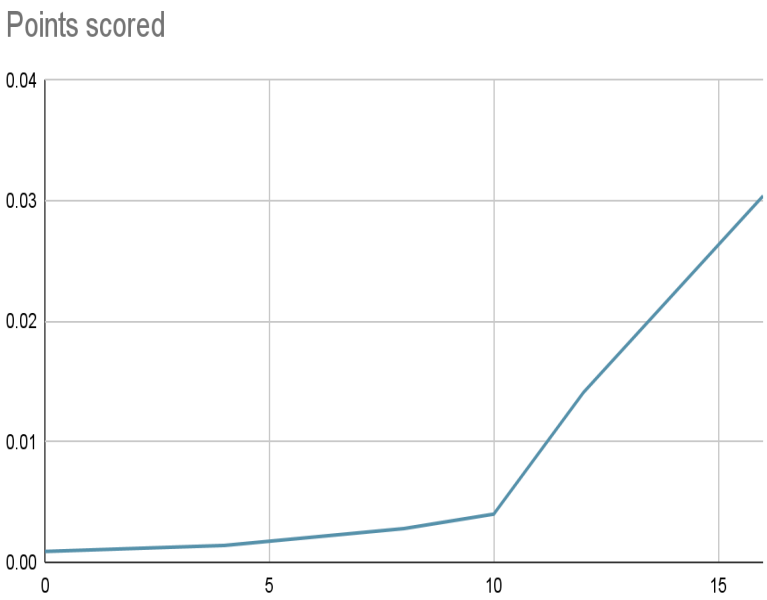


XLfr5 graph:

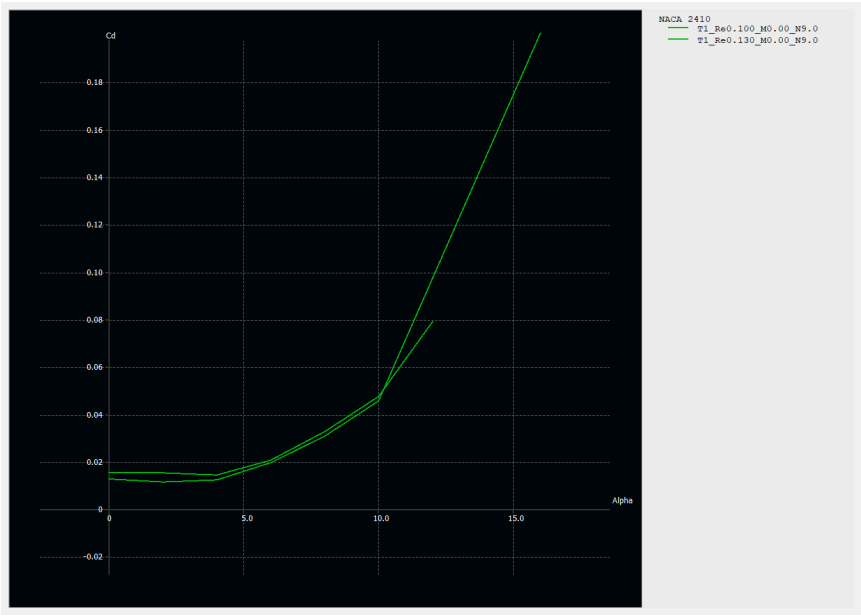


Cd vs AoA

ANSYS results graph :



XLfr5 graph:



Numerical data

NACA 4412

0 degree Cl = 0.0 Cd =0.0008

4 degree Cl = 0.0788 Cd = 0.0016

8 degree Cl = 0.1113 Cd = 0.003

10 degree Cl = 0.1269 Cd = 0.0038

12 degree Cl = 0.1327 Cd = 0.0055

16 degree Cl= 0.1011 Cd = 0.0141

LNV109A

0 degree Cl = 0 Cd = 0.0076

4 degree Cl = 0.2134 Cd = 0.0224

8 degree Cl = 0.4543 Cd = 0.0711

10 degree Cl = 0.5678 Cd = 0.1072

12 degree CL = 0.6747 Cd = 0.1504

16 degree Cl = 0.8631 Cd = 0.2524

NACA 2410

0 degree Cl = 0 Cd = 0.0009

4 degree Cl = 0.0605 Cd = 0.0014

8 degree Cl = 0.0919 Cd = 0.0028

10 degree Cl = 0.1049 Cd = 0.0040

12 degree Cl = 0.1129 Cd = 0.0141

16 degree Cl = 0.0720 Cd = 0.0304