Evaluation of the Eppler 1210 Airfoil

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1 Introduction

1. show airfoil
2. table of freestream conditions and Re
3. xfoil estimates of:
   - max L/D ratio, and AoA at which this occurs
   - max C_l, and AoA at which this occurs
   - Note: take both of the above directly from airfoiltools.com, at the closest reynolds number available

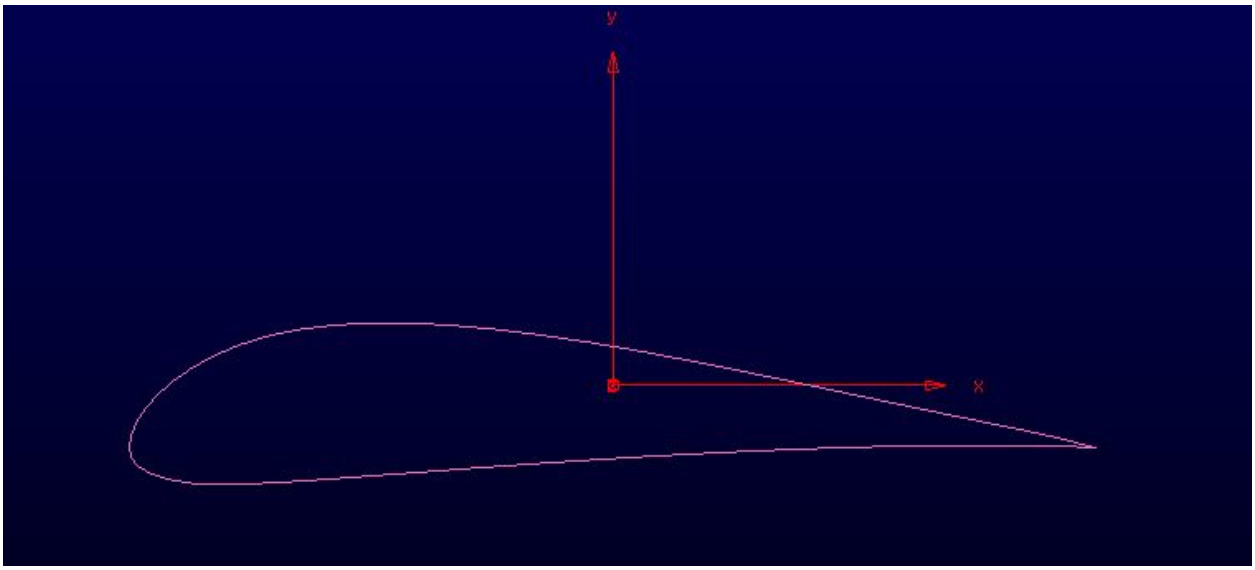

Figure 1: Eppler 1210 Airfoil shown in Pointwise

2 Methodology

1. 4 shots of grid: 1. LE 2. TE 3. near-field for entire shape 4. the entire grid domain. Note: should show T-rex feature that was used
2. table 1: cell count and normal-to-wall spacing used, list BC, list reference values, list submodels chosen (i.e. viscous model), provide numerical scheme and spacial accuracy

Table 1: Operating conditions for all cases

Quantity	Value
Pressure	103,000 Pa
Temperature	298 K
Velocity	17.88 ms^{-1}
Viscosity	1.789e-05 $kgm^{-1}s^{-1}$
Re #	1,224,315

Table 2: XFoil Predictions

	Value	AoA
Max L/D	117.1309	8
Max C_L	1.8542	16

3 Results

1. plot lift and drag coeff histories for proof of convergence history for ALL Runs (appendix)
2. Table of C_l, C_d, L/D, C_m
3. plots of the items in the table and compared against Xfoil data at the closest Re # (take directly from airfoiltools.com)
4. streamlines and pressure contours to depict flow near airfoil
   - 1 plot for each case
   - use the same contour levels
5. y+ curves (for 0° AoA case)
6. plot showing turbulent boundary layer development (0° AoA case)

4 Discussion

Is the agreement between your CFD model and XFOIL within this same tolerance level for lift and drag? (10% error bar)

5 Conclusion

"I always thought something was fundamentally wrong with the universe" [**?**]