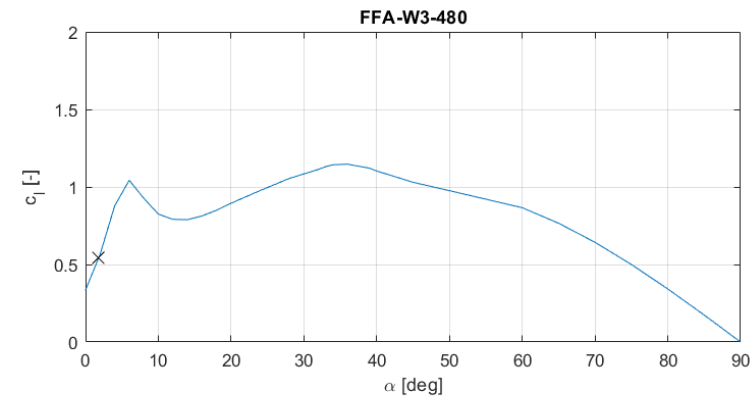
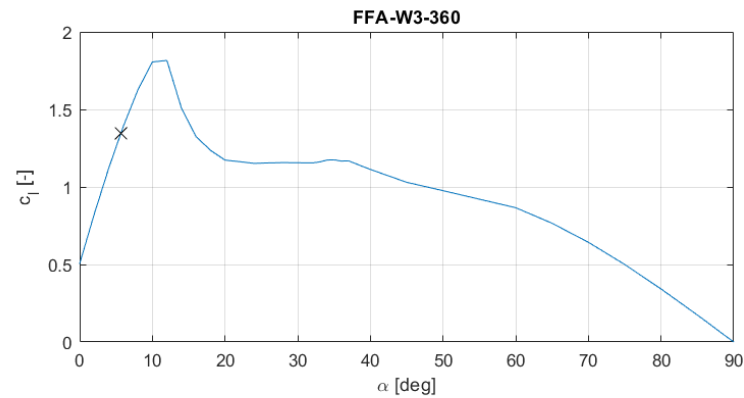
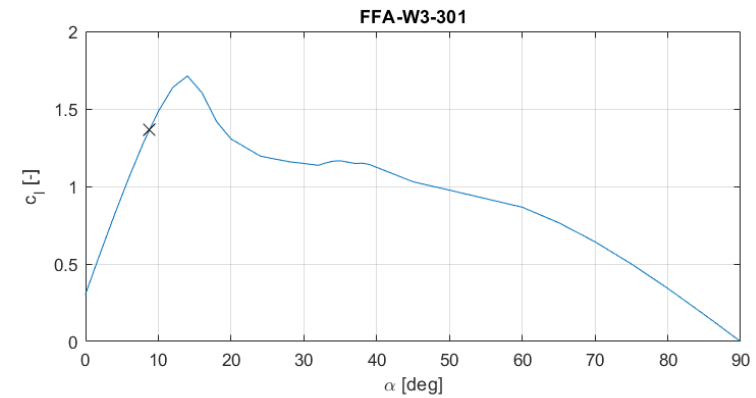
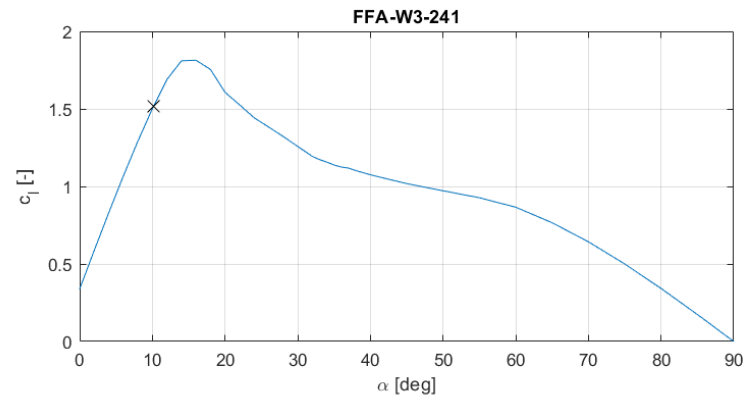


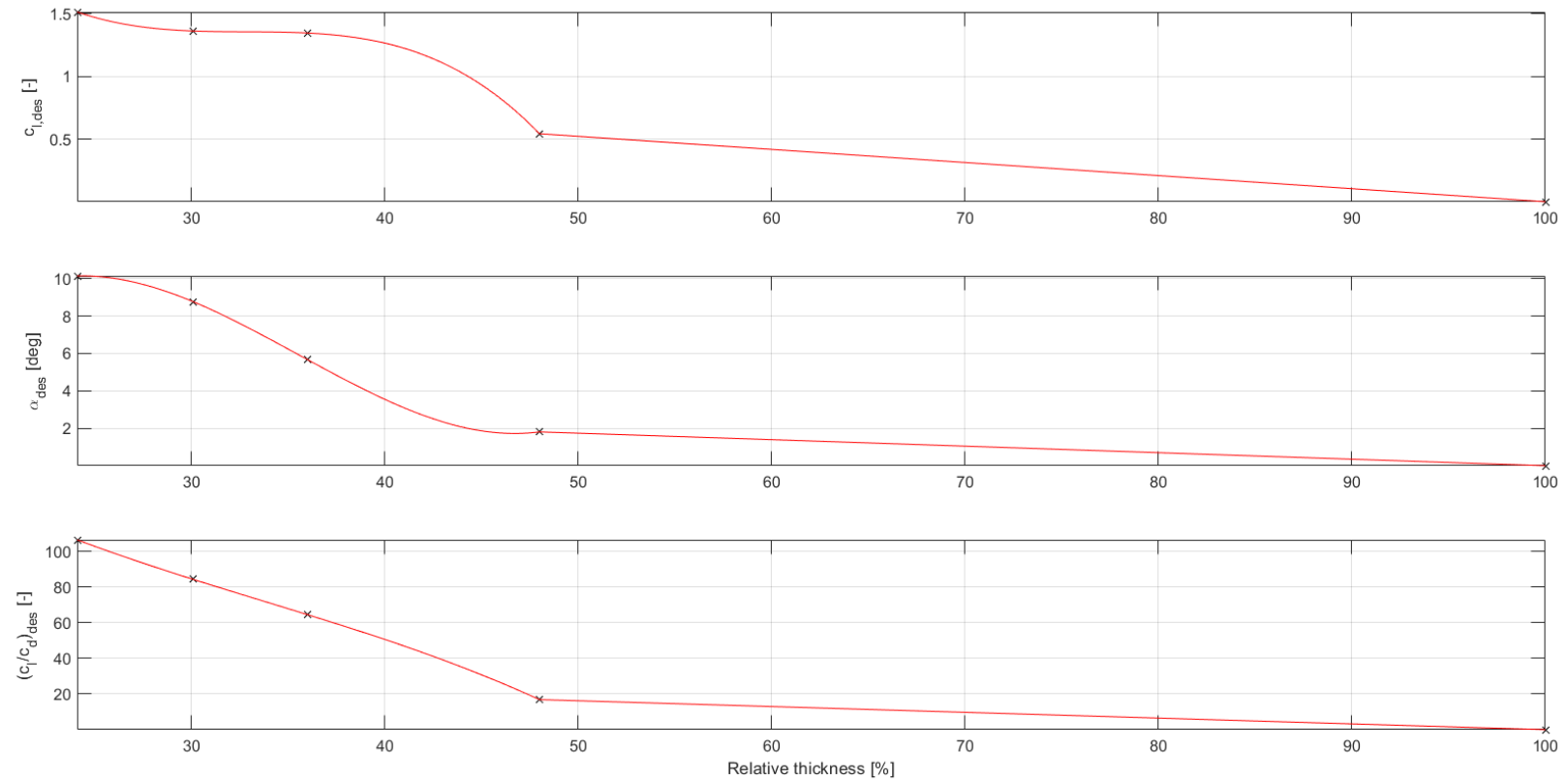
Assignment 1

Aerodynamic rotor design for Class IIIB

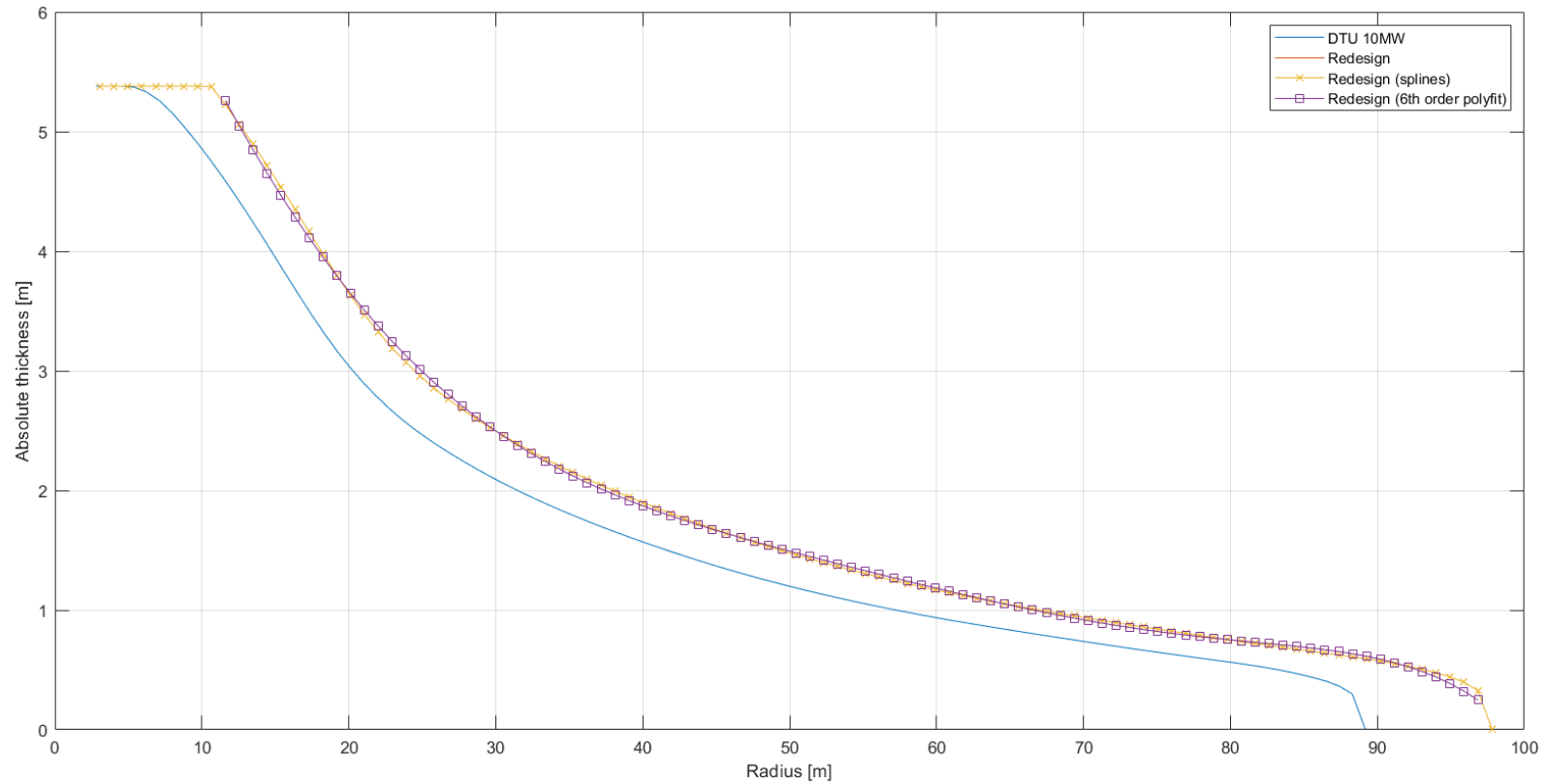
Part 1: Aerofoil polars (c_l vs. α)



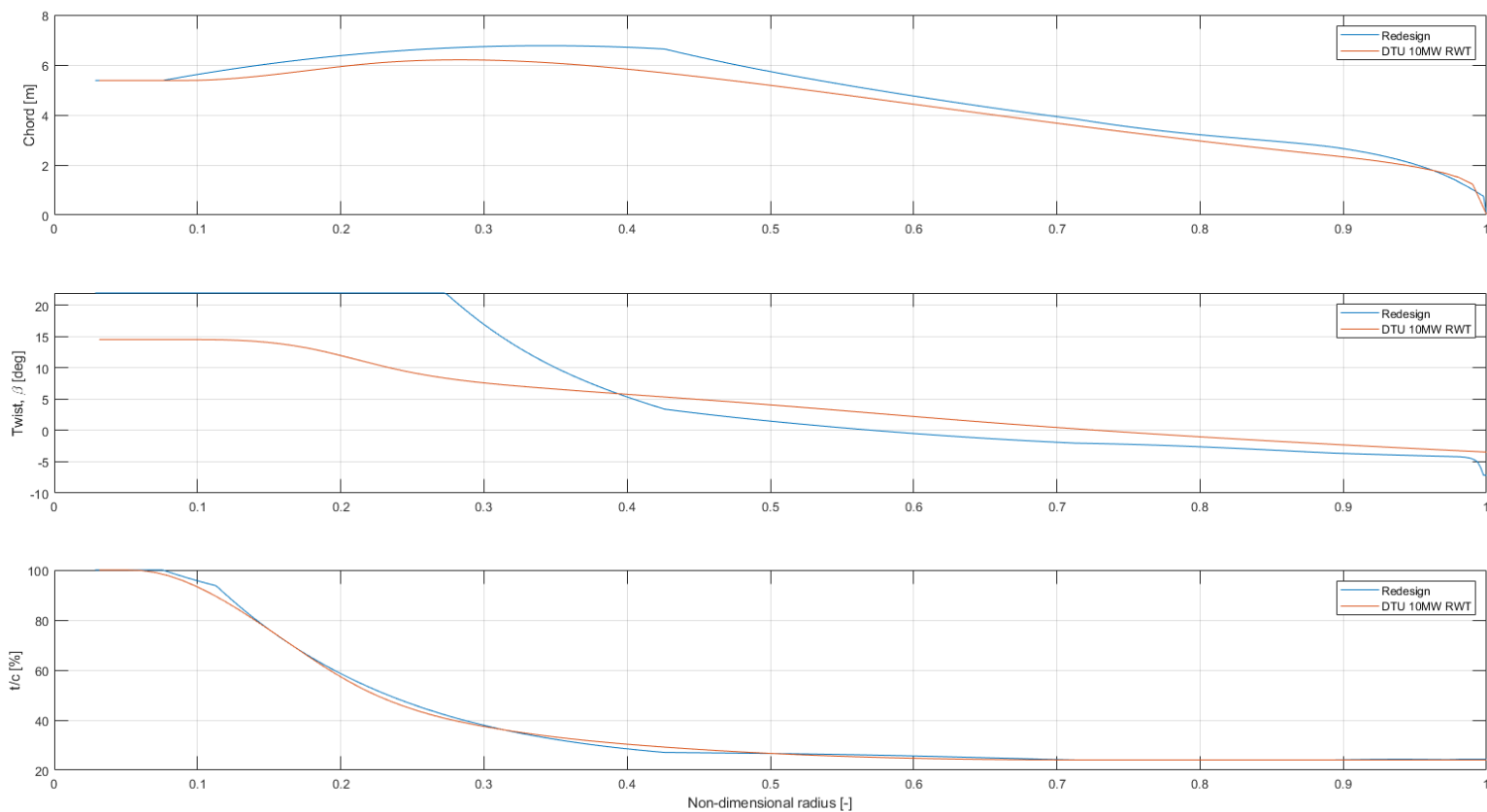
Part 1: Design polynomials



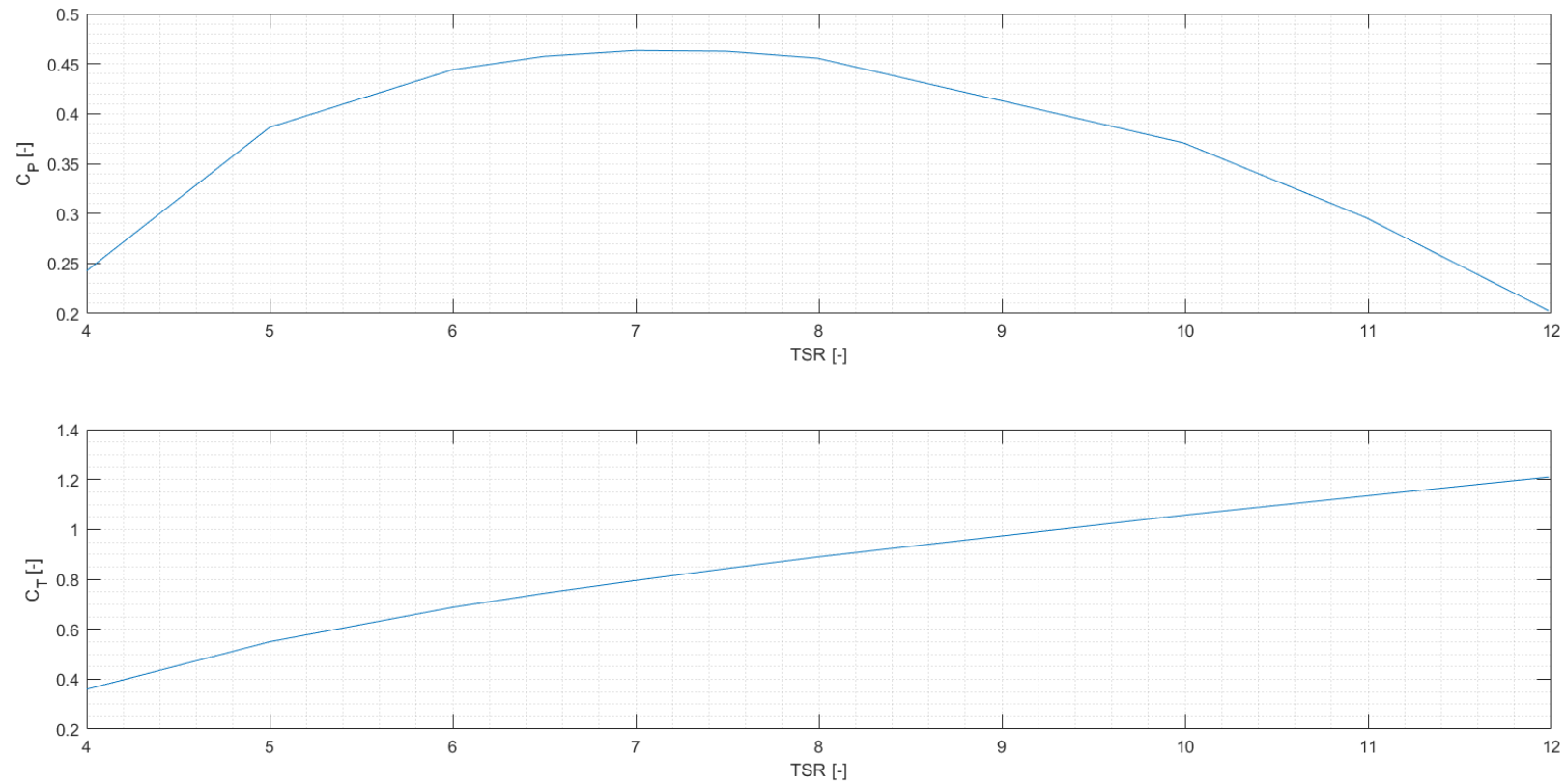
Part 1: Absolute thickness distribution



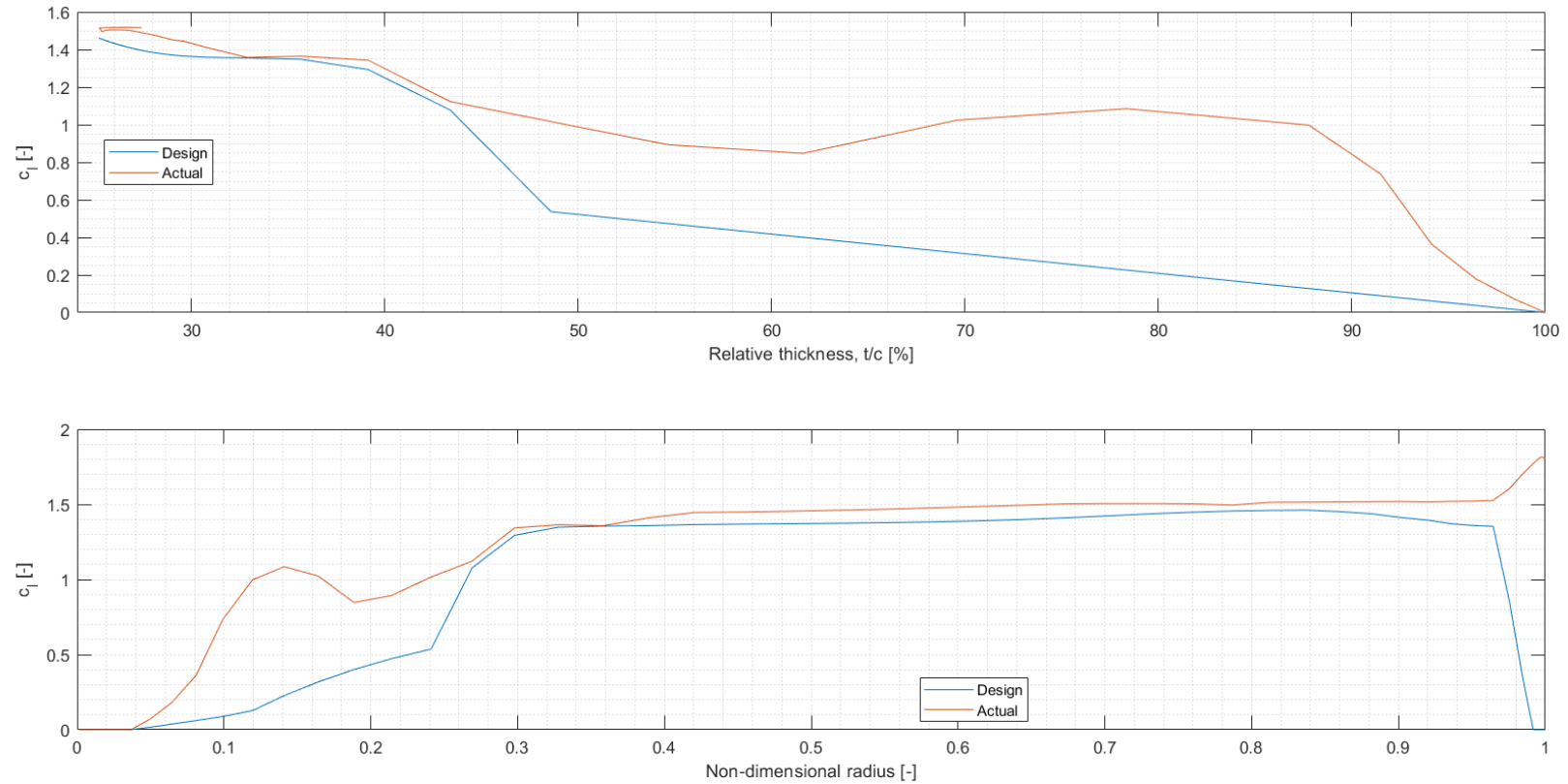
Part 1: Final geometry



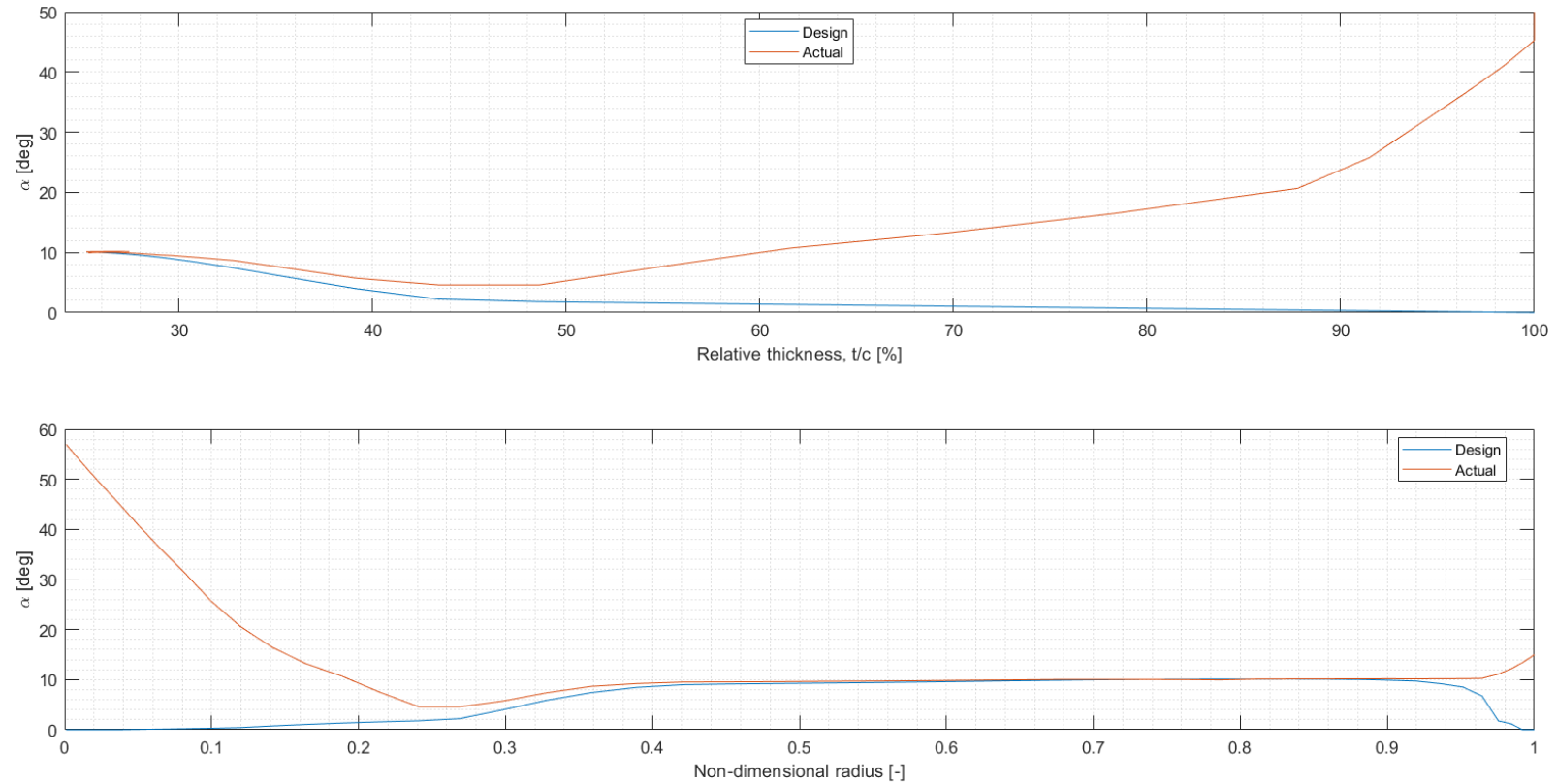
Part 2: CP and CT vs. TSR



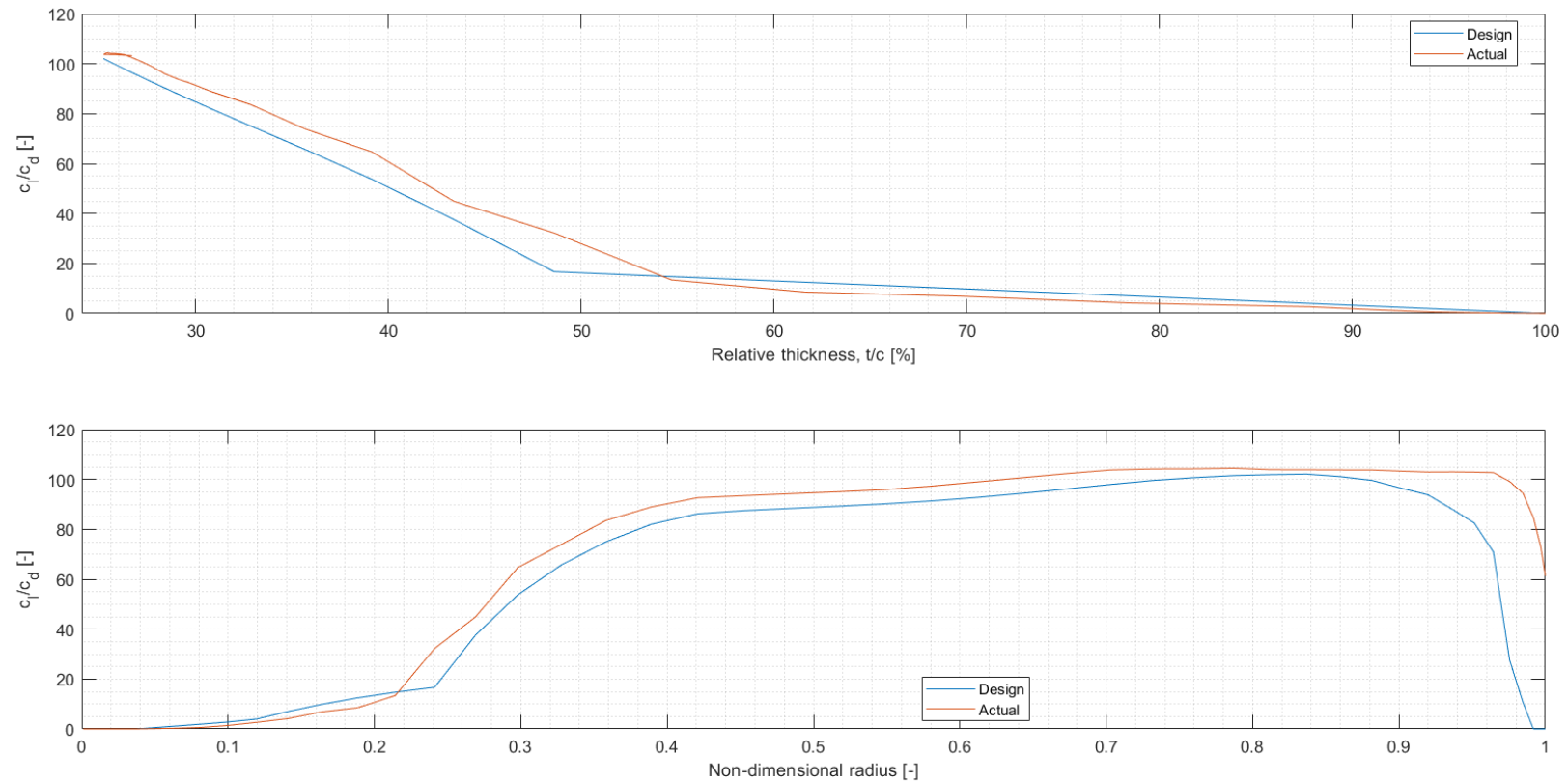
Part 2: Actual and design lift coefficients



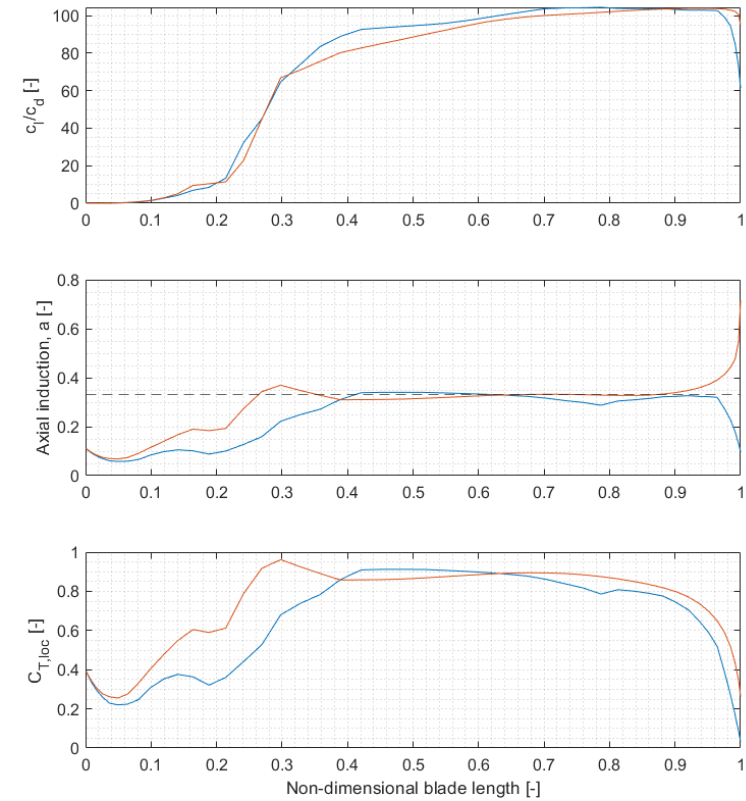
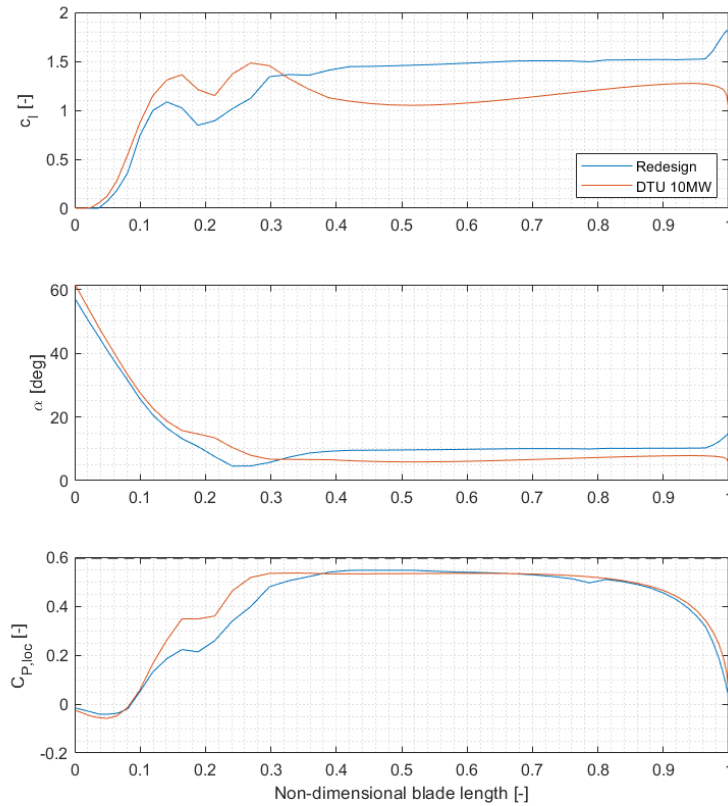
Part 2: Actual and design angle of attack



Part 2: Actual and design lift-drag ratio

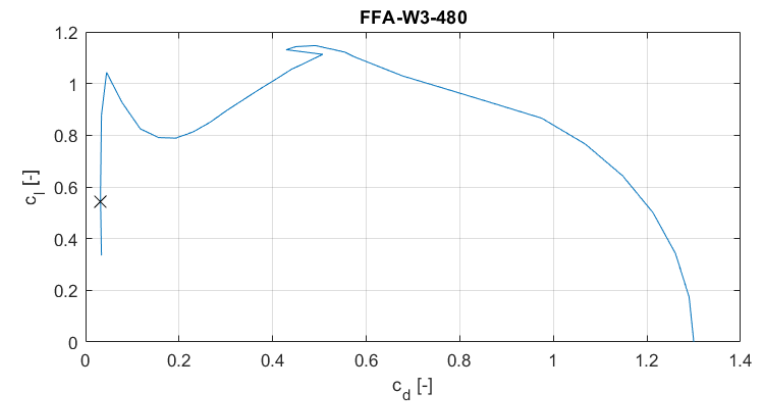
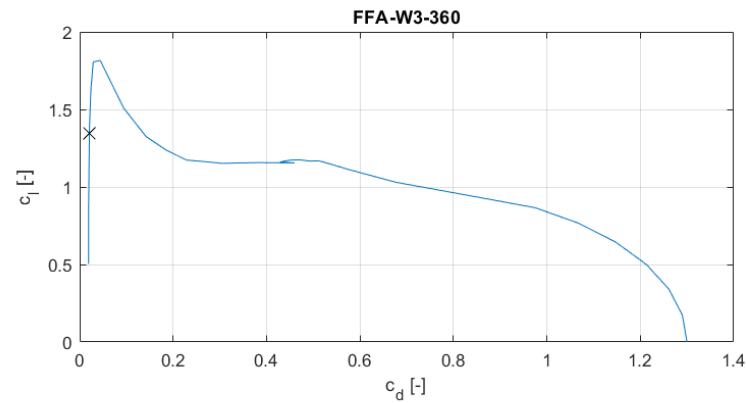
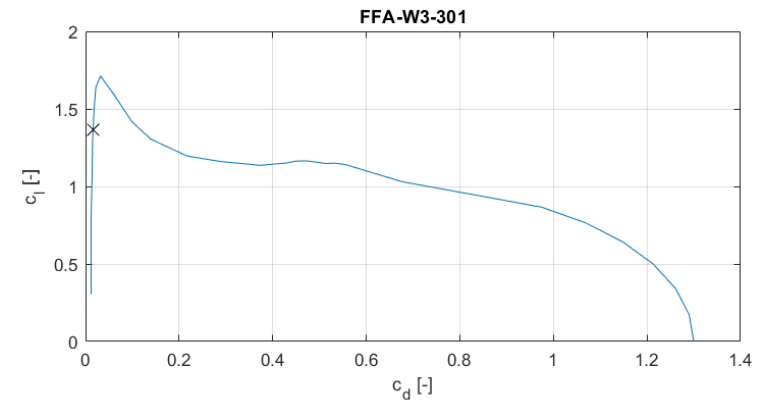
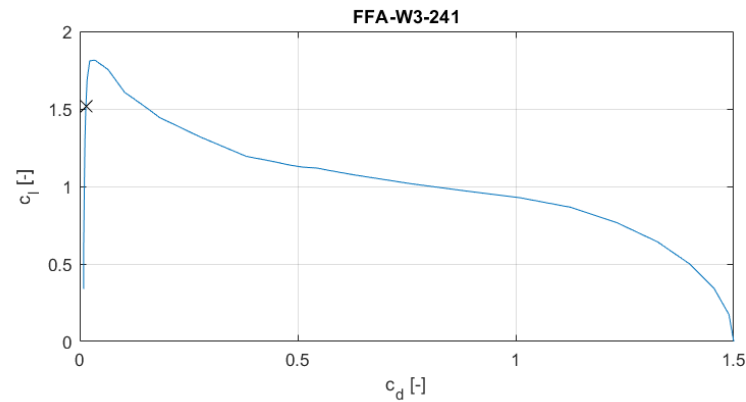


Part 2: Spanwise values

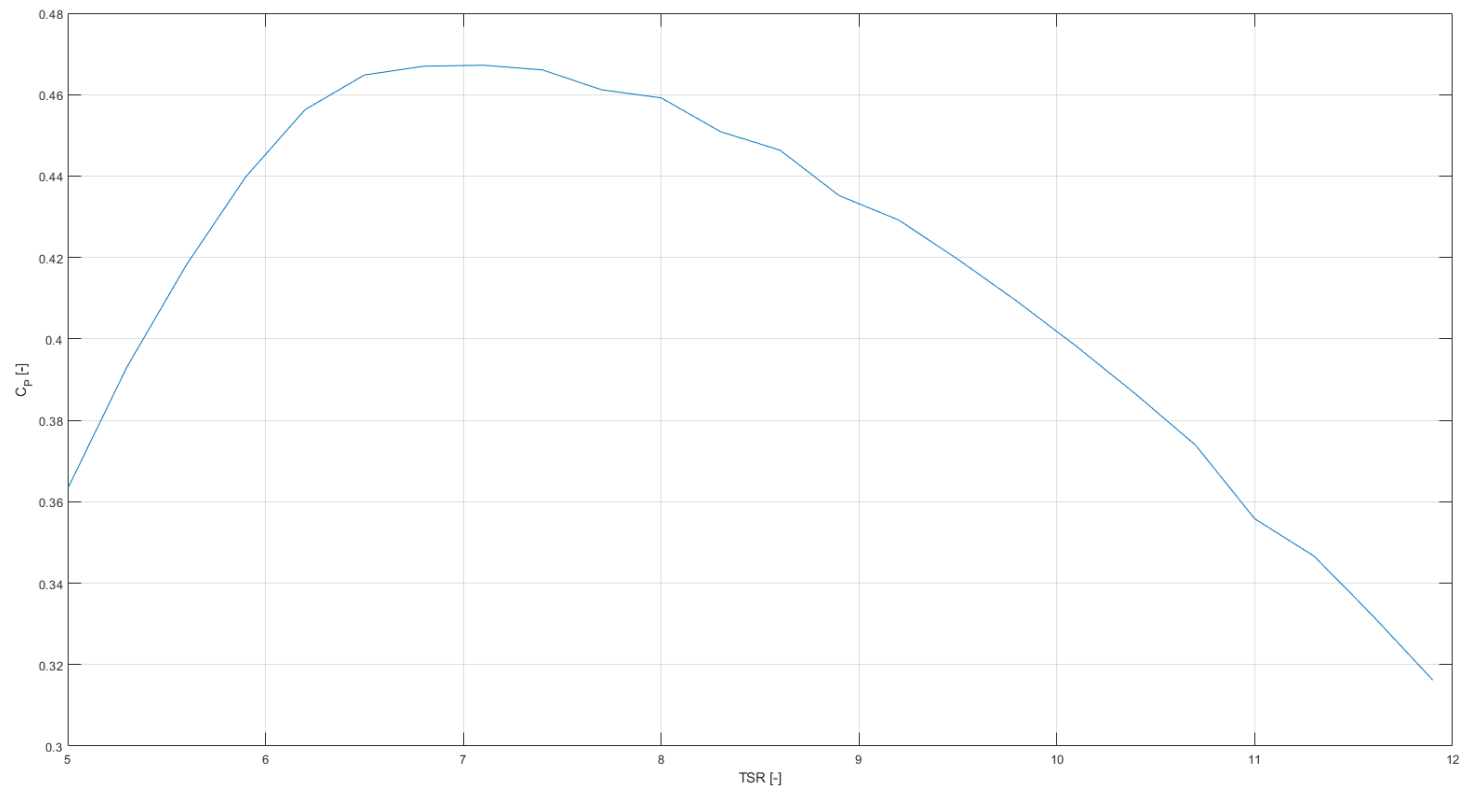


Appendix

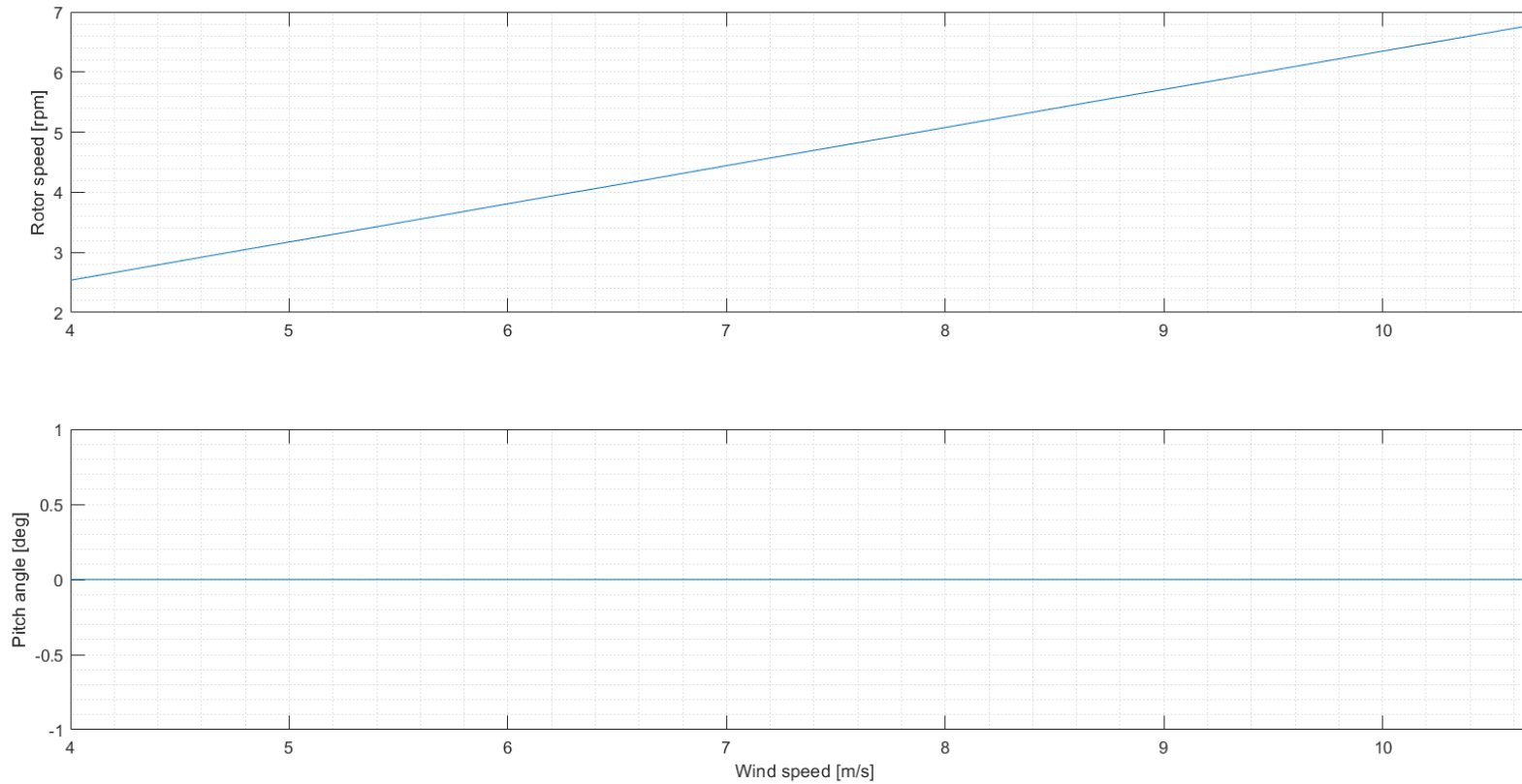
Part 1: Aerofoil polars (cl vs. cd)



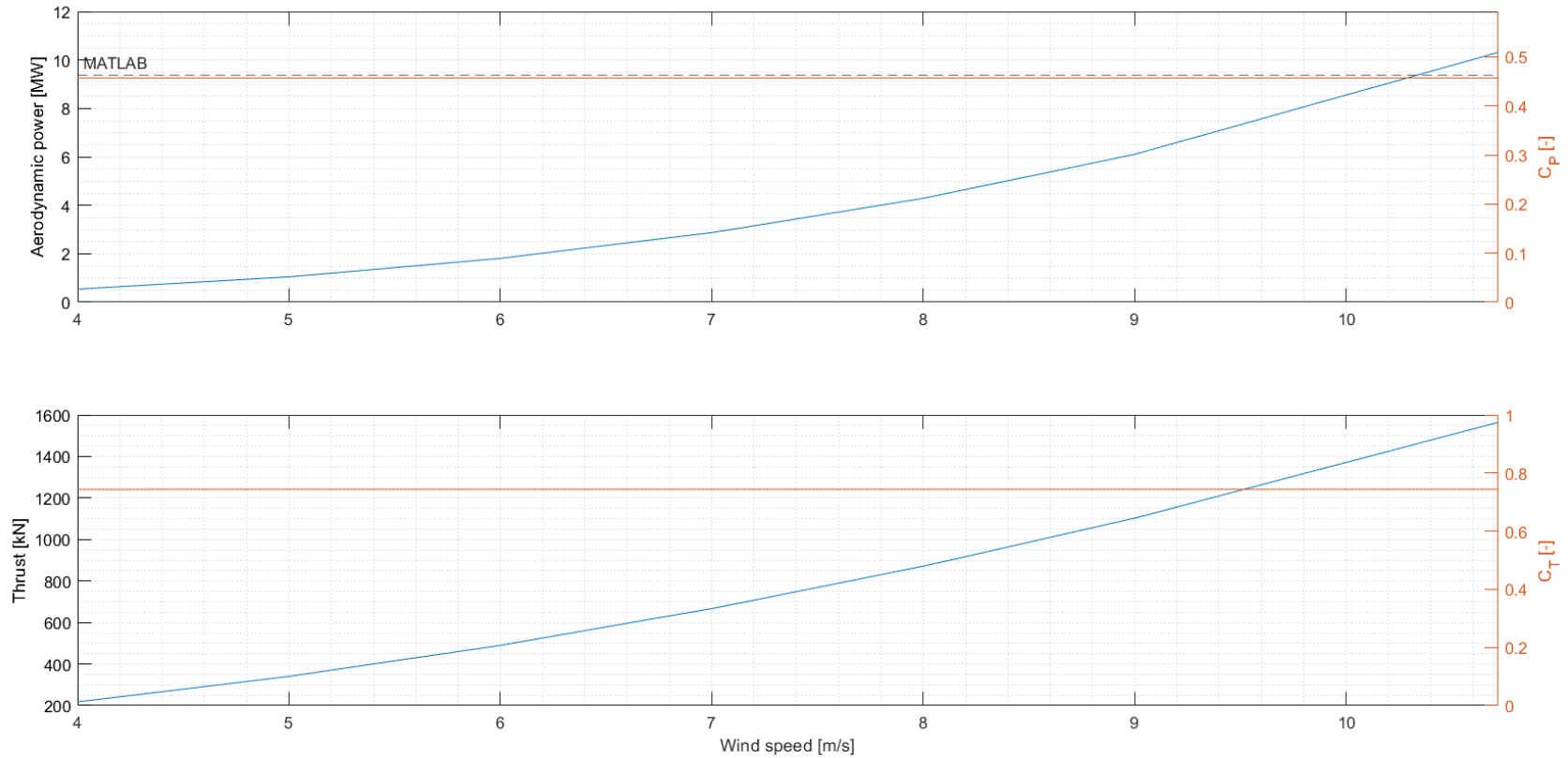
Part 1: C_P vs. TSR



Part 2: Rotor speed and pitch vs. wind speed



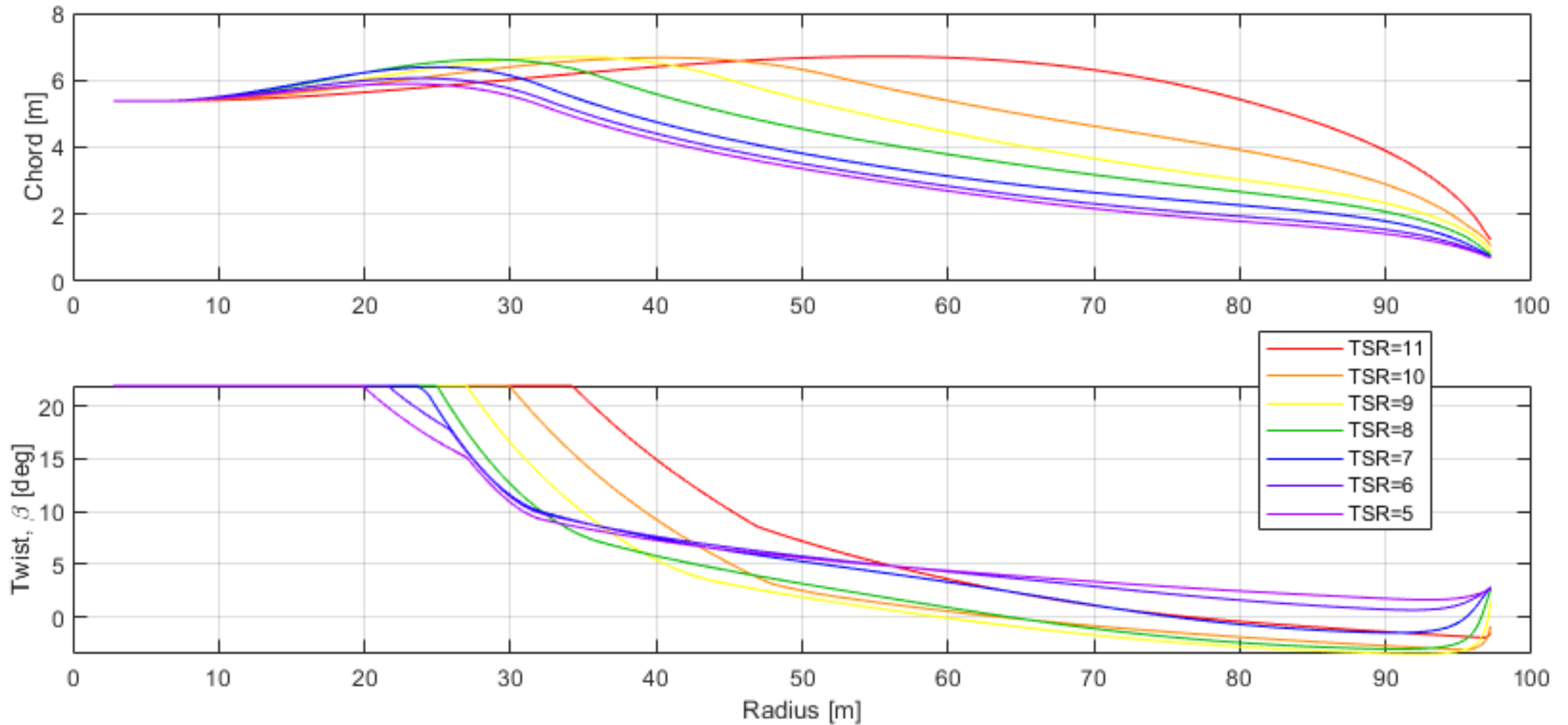
Part 2: Power, C_P , thrust, and C_T vs. wind speed



Part 1: Design polynomials

Parameter	$24.1\% \leq \hat{t} \leq 48\%$	$48\% \leq \hat{t} \leq 100\%$
c_l	$-2.2962 * 10^{-4} * \hat{t}^3 + 0.0226 * \hat{t}^2 - 0.7430 * \hat{t} + 9.499$	$-0.0104 * \hat{t} + 1.0442$
α	$0.0015 * \hat{t}^3 - 0.1604 * \hat{t}^2 + 5.137 * \hat{t} - 41.5476$	$-0.0348 * \hat{t} + 3.4783$
$\frac{c_l}{c_d}$	$-0.0027 * \hat{t}^3 + 0.2707 * \hat{t}^2 - 12.4438 * \hat{t} + 286.7328$	$-0.3244 * \hat{t} + 32.4383$

Chord and twist distributions for various TSRs



Group 7 work distribution.

Stef: Worked on producing a geometry with his own MATLAB script, found out about problems before the rest and allowed us to anticipate things as a group. Wrote inputs for HAWC2 first and then helped Nick with the second version.

Nils: Worked on a second version of the geometry with the others, writing a MATLAB script. Wrote a post-processing script to evaluate the results from HAWC2.

Nick: Pair coded and debugged Nils' script. Wrote the second geometry into HAWC2 and produced results for post-processing.

Eduardo: Picked up the pieces. Helped improve the splines for the geometry, wrote a script to make inputs to HAWC easier and was all round very helpful with the trickier bits of code.