

AE 3310 Introduction to Aerospace Vehicle Performance

Homework #3

Due Tuesday, June 5, 2001

1. What is the difference between total pressure and dynamic pressure?
2. What is a boundary layer?
3. What is “laminar flow”? What is “turbulent flow”?
4. For an airfoil, what is typically denoted by $\alpha_{L=0}$?
5. What is referred to as a “drag bucket”?
6. Using the curve fit features available in Excel and the provided airfoil data sheet, NACA 2412, at each of the Re numbers shown best curve fit the data and obtain the equations for:
 - a. $C_l(\alpha)$
 - b. $C_{m_{c/4}}(\alpha)$
 - c. $C_d(C_l)$

Please indicate the range of argument values over which the curve fit equations are valid. Provide charts of your data and the corresponding curve fits, including the display of the curve fit equation and the goodness of fit parameter on the chart.

Present your results in a neat, legible, format. Indicate units.