

AA210A Homework 3 2020 -2021

Due Wednesday October 7

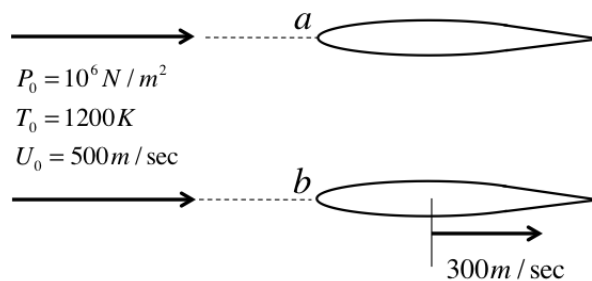
Read: Chapters 3, 4 and 5

Chapter 3 - Problems 1, 5, and 6

Chapter 4 - Problems 1 and 4

Chapter 5 – Problems 2 and 6

Problem The figure below shows high velocity flow of hot air past a symmetric wing. The ambient pressure and temperature are $P_0 = 10^6 \text{ N/m}^2$, $T_0 = 1200 \text{ K}$. Assume the air to be calorically perfect.



Two cases are shown.

a) The wing is at rest in the frame of reference of the oncoming flow at 500 m/sec .

b) The wing is translating to the right away from the oncoming flow at a speed of 300 m/sec .

Consider a gas element that stagnates at the leading edge of the wing in each case, identified as points a and b for the two cases.

1) Determine T_{ia} / T_0

2) Determine P_{ia} / P_0

3) Determine T_{ib} / T_0

4) Determine P_{ib} / P_0

5) State the assumptions you used to solve the problem.