AE 333/707: Tutorial 1.1

1. The sectional lift force and pitching moment about the leading edge for an airfoil at a certain angle of attack are 500 N/m and -155 N, respectively. At a different angle of attack, the same quantities are 2000 N/m and -605 N, respectively. What is the x-coordinate of the aerodynamic center, and what is the sectional pitching moment of the airfoil about this point?

2. The basic dimensions relevant for fluid mechanics are length (L), mass (M) and time (T). In high-school physics, you have come across four other basic dimensions – viz. temperature (Θ), electric current (I), luminous intensity (C) and amount of matter (i.e., no. of moles) (N). Even though temperature is a bona fide flow variable, at least in compressible flows, why is it not considered as a basic dimension in fluid mechanics?