

# Aeroelasticity M2795.005900

## Mid-term Exam

10/26/2020 (Mon) 2:00 – 3:30 PM

1. (50Points) Briefly describe the aeroelastic effects of **sweeping** a lifting surface **back** with respect to the following considerations:
  - (a) Torsional divergence
  - (b) Spanwise airload distribution
  - (c) Structural loads at given normal load factor
  - (d) Aileron reversal dynamic pressure
  - (e) Flutter

(Provide relevant diagrams or figures for each answer.)

2. (20Points) To determine the unsteady airload distribution on an elastic wing of an aircraft in a specified normal load factor, explain why it is necessary to consider **both** lift **and** aerodynamic pitching moment on the vehicle.
3. (30Points) Briefly describe the characteristics, including its solution methodology, of the **unsteady incompressible potential flow equation**. Also, list the categories of its possible analytical solutions based on different level of simplification.