

10610PME4147 飛行力學課程大綱

上課時間：W2W3W4

授課老師：賴君亮老師

Flight Mechanics

“Introduction to Flight”, John, D. Anderson, McGraw Hill

1 Brief Review of Aerodynamics

- 1-1 Introduction
- 1-2 Thin Airfoil Theory
- 1-3 Aerodynamic Parameters
- 1-4 Infinite Wings
- 1-5 Mach Number Effects—Subsonic Effects
- 1-6 Supersonic Flight
- 1-7 Finite Wings
- 1-8 Swept Wings
- 1-9 Twist Wings
- 1-10 Summary of Airfoil Shape

2 Elements of Airplane Performance

- 2-1 Introduction
- 2-2 Equations of Motion
- 2-3 Thrust Required for Level Unaccelerated Flight
- 2-4 Thrust Available for Level Unaccelerated Flight
- 2-5 Power Required for Level Unaccelerated Flight
- 2-6 Power Available for Level Unaccelerated Flight
- 2-7 Altitude Effects on P_A and P_R
- 2-8 Rate of Climb
- 2-9 Absolute and Service Ceilings
- 2-10 Time to Climb
- 2-11 Range and Endurance—Propeller Driven Airplane
- 2-12 Range and Endurance—Jet Airplane
- 2-13 Takeoff
- 2-14 Landing
- 2-15 Turning Flight and the V - n Diagram
- 2-16 Accelerated Rate of Climb (Energy Method)
- 2-17 Summary

3 Static Stability and Control

- 3-1 Introduction
- 3-2 Control Elements of an Airplane
- 3-3 Criteria for Longitudinal Static Stability—Qualitative Stability Analysis
- 3-4 Quantitative Analysis of Longitudinal Static Stability

- 3-5 Static Longitudinal Control and Elevator Deflection
- 3-6 Stick-Free Longitudinal Static Stability
- 3-7 Steady Pull-up Maneuver
- 3-8 Directional Static Stability and Control
- 3-9 Lateral Static Stability and Control
- 3-10 Coupling Effects
- 3-11 Rolling Moment due to Sideslip

4 Astronautics

- 4-1 The Two Body Dynamics
- 4-2 Motion of Rocket
- 4-3 Interplanetary Orbital Transfer
- 4-4 Epochs and Time-of-Trip
- 4-5 Planetary Environment
- 4-6 Lifetime of a Satellite in a Circular Orbit
- 4-7 Ballistic Entry
- 4-8 Aerodynamic Heating