



Wintersemester 2021/22

Lecture: Tuesday, 10.00 – 11.30, Zoom

Exercise: Thursday, 12.45 – 13.30, Zoom

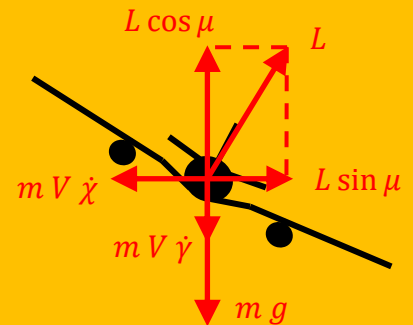
Introduction to Flight Mechanics and Control

Prof. Dr.-Ing. Florian Holzapfel

$$\dot{V} = \frac{T - D}{m} - g \sin \gamma$$

$$\dot{\alpha} = \frac{-L}{mV \cos \beta} + \frac{g}{V} \cdot \frac{\cos \mu \cos \gamma}{\cos \beta} + [q - \tan \beta \cdot (p \cos \alpha + r \sin \alpha)]$$

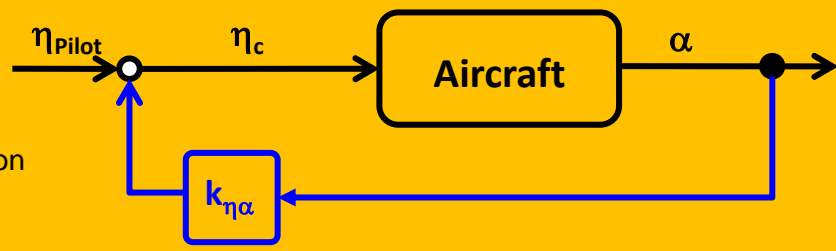
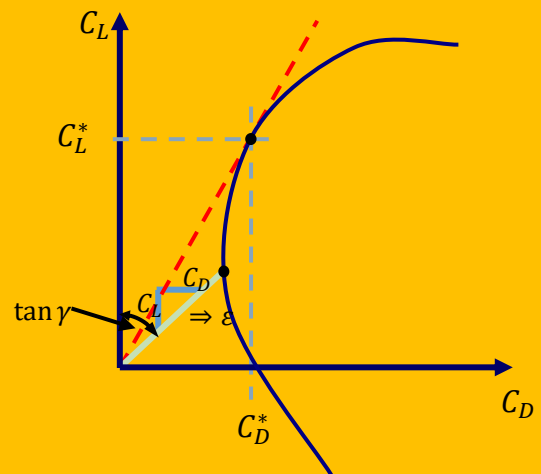
$$\dot{\beta} = \frac{Q}{mV} + \frac{g}{V} \cdot \cos \gamma \cdot \sin \mu + (-r \cos \alpha + p \sin \alpha)$$



The bachelor-level lecture “**Introduction in Flight System Dynamics and Flight Control**” shall give a broad overview over the subjects, which are provided by the institute of Flight System Dynamics.

The lecture comprises two parts. The first section “**Flight Mechanics**” explains the fundamentals of the atmosphere, the forces acting on the aircraft and flight performance calculation.

The second section “**Flight Control**” elaborates on the topics of stability & control augmentation. Besides that, the lecture introduces the topic of autopilots, that is the full automation of aircraft movement by means of control theory.



Content

1. Coordinate systems & transformation
2. ISA standard atmosphere
3. Forces and moments at the aircraft
4. Equations of motion of a point mass aircraft
5. Flight phases
6. Equation of motion of a rigid body aircraft
7. Static Stability
8. Eigen motion of the aircraft and dynamic stability
9. Overview flight controller
 - a) Stability augmentation
 - b) Control augmentation
10. Introduction to autopilots

If you encounter any questions, reach out to:

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