

1. Record Nr.	UNINA9910825103603321
Autore	Cook M. V
Titolo	Flight dynamics principles : [a linear systems approach to aircraft stability and control] // M.V. Cook
Pubbl/distr/stampa	Oxford [UK] ; ; Burlington, MA, : Butterworth-Heinemann/Elsevier, 2007
ISBN	1-281-02927-0 9786611029272 0-08-055036-3
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (491 p.)
Collana	Elsevier aerospace engineering series
Disciplina	629.1 629.1323
Soggetti	Aerodynamics Flight Stability of airplanes
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Front cover; Flight Dynamics Principles; Copyright page; Contents; Preface to the first edition; Preface to the second edition; Acknowledgements; Nomenclature; Chapter 1. Introduction; 1.1 Overview; 1.2 Flying and handling qualities; 1.3 General considerations; 1.4 Aircraft equations of motion; 1.5 Aerodynamics; 1.6 Computers; 1.7 Summary; References; Chapter 2. Systems of axes and notation; 2.1 Earth axes; 2.2 Aircraft body fixed axes; 2.3 Euler angles and aircraft attitude; 2.4 Axes transformations; 2.5 Aircraft reference geometry; 2.6 Controls notation; 2.7 Aerodynamic reference centres ReferencesProblems; Chapter 3. Static equilibrium and trim; 3.1 Trim equilibrium; 3.2 The pitching moment equation; 3.3 Longitudinal static stability; 3.4 Lateral static stability; 3.5 Directional static stability; 3.6 Calculation of aircraft trim condition; References; Problems; Chapter 4. The equations of motion; 4.1 The equations of motion of a rigid symmetric aircraft; 4.2 The linearised equations of motion; 4.3 The decoupled equations of motion; 4.4 Alternative forms of the equations of motion; References; Problems; Chapter 5. The solution of the equations of motion

5.1 Methods of solution; 5.2 Cramer's rule; 5.3 Aircraft response transfer functions; 5.4 Response to controls; 5.5 Acceleration response transfer functions; 5.6 The state space method; 5.7 State space model augmentation; References; Problems; Chapter 6. Longitudinal dynamics; 6.1 Response to controls; 6.2 The dynamic stability modes; 6.3 Reduced order models; 6.4 Frequency response; 6.5 Flying and handling qualities; 6.6 Mode excitation; References; Problems; Chapter 7. Lateral-directional dynamics; 7.1 Response to controls; 7.2 The dynamic stability modes; 7.3 Reduced order models; 7.4 Frequency response; 7.5 Flying and handling qualities; 7.6 Mode excitation; References; Problems; Chapter 8. Manoeuvrability; 8.1 Introduction; 8.2 The steady pull-up manoeuvre; 8.3 The pitching moment equation; 8.4 Longitudinal manoeuvre stability; 8.5 Aircraft dynamics and manoeuvrability; References; Chapter 9. Stability; 9.1 Introduction; 9.2 The characteristic equation; 9.3 The Routh-Hurwitz stability criterion; 9.4 The stability quartic; 9.5 Graphical interpretation of stability; References; Problems; Chapter 10. Flying and handling qualities; 10.1 Introduction; 10.2 Short term dynamic models; 10.3 Flying qualities requirements; 10.4 Aircraft role; 10.5 Pilot opinion rating; 10.6 Longitudinal flying qualities requirements; 10.7 Control anticipation parameter; 10.8 Lateral-directional flying qualities requirements; 10.9 Flying qualities requirements on the s-plane; References; Problems; Chapter 11. Stability augmentation; 11.1 Introduction; 11.2 Augmentation system design; 11.3 Closed loop system analysis; 11.4 The root locus plot; 11.5 Longitudinal stability augmentation; 11.6 Lateral-directional stability augmentation; 11.7 The pole placement method; References

Sommario/riassunto

The study of flight dynamics requires a thorough understanding of the theory of the stability and control of aircraft, an appreciation of flight control systems and a comprehensive grounding in the theory of automatic control. Flight Dynamics provides all three in an accessible and student focussed text. Written for those coming to the subject for the first time the book is suitable as a complete first course text. It provides a secure foundation from which to move on to more advanced topics such as non-linear flight dynamics, simulation and advanced flight control, and is ideal for the
