

Capitole speciale de dinamica zborului

Obiectiv principal

Insusirea de catre masteranzi a unor capitole avansate de dinamica zborului, legate in special de stabilitatea zborului elicopterelor si rachetelor. Prima parte a cursului este dedicata studiului stabilitatii zborului rachetelor, avand ca baza cunostiintele dobandite in cadrul cursului de Dinamica Zborului din cadrul ciclului de licenta. In a doua parte a cursului se urmareste prezentarea modului de estimare a performantelor elicopterelor urmata de studii amanuntite privind stabilitatea zborului acestora.

Course Objective

Mastering mastering of advanced flight dynamics chapters, especially related to the stability of helicopter and rocket flight. The first part of the course is dedicated to the rocket stability study, based on the knowledge gained during the Flight Dynamics course during the license cycle. The second part of the course aims to present the way of estimating the performance of the helicopters followed by detailed studies of the stability of their flight.

Curs

2 ore/săptămână, total 28 ore

- Chestiuni introductive privind zborul rachetei
- Ecuatiile miscarii generale
- Formele decuplate ale ecuatiilor miscarii comandate
- Chestiuni introductive privind zborul elicopterului
- Aerodinamica elicopterului
- Performantele si stabilitatea elicopterului
- Raspunsul la comenzi al elicopterului

Course

2 hours weekly, 28 hours total

- Introductory questions on rocket flight
- Equations of general motion
- Decoupled forms of ordered motion equations
- Flight helicopter introductory issues
- Helicopter Aerodynamics
- Performance and stability of the helicopter
- The helicopter command response

Laborator

1 ora/săptămână, total 14 ore

- Caracteristici aerodinamice ale rachetei. Polare, coeficienti aerodinamici.
- Ecuatiile de miscare ale rachetei. Simularea numerica a miscarii rachetei.
- Raspunsul la comenzi al rachetei dirijate.
- Performantele rotorului principal al elicopterului.
- Stabilitatea statica si stabilitatea dinamica a elicopterului
- Studiul stabilitatii elicopterului prin liniarizarea ecuatiilor de miscare.
- Simularea numerica a zborului elicopterului utilizand ecuatiile neliniare.

Laboratory

1 hour weekly, 14 hours total

- Aerodynamic features of the rocket. Polar, aerodynamic coefficients.
- Rocket motion equations. Numerical simulation of rocket movement.
- Response to command of the missile.
- The performance of the helicopter's main rotor.
- Static stability and dynamic stability of the helicopter
- Helicopter stability study by linearizing motion equations.
- Numerical helicopter flight simulation using nonlinear equations.