



FINAL PROJECT ASSIGNMENT

Publicly Available

Identification	Name: Horváth Dávid András		ID: 78526889242	
	Code of the Curriculum: 2N-MW0		Specialisation:	Document ref. number:
	Curriculum: Gépészeti modellezés mesterképzési szak		2N-MW0-FM	GEÁT:2023-2:2N-MW0:YJEQDB
	Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics	
Supervisor: Dr. Bak Bendegúz Dezső (79513977519), assistant professor				

Project Description	Title	Development of a nonlinear reduced order drone model Redukált nemlineáris drónmodell megalkotása
	Details	<p>The application of drones or unmanned air vehicles (UAVs) is increasingly common for various tasks. The main reasons behind this are the increased reliability and the fact that only structural and aerodynamic properties limit their maneuvers. During the research, a reduced order model will be developed, which can be used for designing drones and their control systems.</p> <p>Tasks:</p> <ol style="list-style-type: none">1. Surveying and analyzing relevant resources of technical literature.2. Numerical simulation of different drone propeller geometries.3. Identification of the aerodynamical model based on the CFD simulation data.4. Derivation of the governing equation of motion of a 6DoF drone model.5. Simulation and analysis of the model.6. Stability analysis of the reduced order model.7. Effect of the controller parameters on the dynamics.8. 1-parameter bifurcational analysis of the system.9. Comparison of the developed controller with an available simpler controller.10. Trajectory tracking of a real life 6DoF Drone and comparison of the trajectories with those of the simplified ROM simulation.11. Summarize the work in the required document format of the MSc Thesis.
	Advisor	Advisor's Affiliation: Dept. Fluid Mechanics, 1111 Budapest, Bertalan L. 4-6. Advisor: János LELKES , invited lecturer

Final Exam	1 st subject (group)	2 nd subject (group)	3 rd subject (group)	4 th subject (group)
	ZVEGEÁTNW02 Computational Fluid Dynamics	ZVEGEÁTNW03 Fluid Mechanics Measurements	ZVEGEÁTNW22 Aero-Elasticity	ZVEGEVGNW21 Áramlástechnikai rendszerek dinamikája

Authentication	Handed out: 27 February 2023		Deadline: 2 June 2023	
	Compiled by: Dr. Bak Bendegúz Dezső (79513977519) Supervisor		Verified by: <i>Dr. János Vad</i> (signed) Head of Department	Approved by: <i>Dr. Gábor Györke</i> (signed) Vice-Dean
	The undersigned declares that all prerequisites of the Final Project have been fully accomplished. Otherwise, the present assignment for the Final Project is to be considered invalid. <i>Horváth Dávid András</i>			