



FINAL PROJECT ASSIGNMENT

CLASSIFIED

Identification	Name: Bagyinszki Csaba		ID: 77947519064	
	Code of the Curriculum: 2N-MW0		Specialisation:	Document ref. number:
	Curriculum: Gépészeti modellezés mesterképzési szak		2N-MW0-FM	GEÁT:2023-1:2N-MW0:GXQEJ7
	Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics	
Supervisor: Dr. Havasi-Tóth Balázs (79649277576), assistant professor				

Project Description	Title	Numerical flow simulation of a high energy water jet breakup using the SPH method Nagyenergiájú szabad vízszugár felbomlásának numerikus modellezése az SPH-módszerrel
	Details	<p>In the petroleum industry, liquid jet cutting tools are used to remove petroleum coke residue from large size vessels. This technology is called hydraulic decoking. The jet created by the cutting tool is energetic; therefore, experimental investigation of the flow is difficult, meaning that only a limited number of parameters can be measured accurately, and it requires expensive test equipment.</p> <ol style="list-style-type: none">1. Improve the implemented synthetical divergent free turbulent initial condition (synthetic eddy method - SEM) and compare the results with experimental data.2. Validate the implemented model with the data found in the literature and experiments by setting the free parameters of the drag force and SEM model.3. Investigate the possibilities of computational time reduction by considering symmetric jets and the idea of adaptive spatial resolution techniques. Formulate possible conditions for particle splitting and coalescing as well as particle removals according to the atomization. Formulate a suitable condition for particle splitting, merging and particle removal.4. Summarize the advancements over the former models and formulate further directions for investigation.
	Advisor	Advisor's Affiliation: Flowserve Hungary Services Kft., 4034 Debrecen, Vágóhíd utca 2. Advisor: Péter Tóth, mechanical engineer

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	ZVEGEÁTNW08 Building and Environmental Aerodynamics	ZVEGEÁTNW19 Vehicle Aerodynamics

Authentication	Handed out: 5 September 2022		Deadline: 9 December 2022			
	Compiled by: Dr. Havasi-Tóth Balázs (79649277576) Supervisor		Verified by: <i>Dr. János Vad (signed)</i> Head of Department		Approved by: <i>Dr. Gábor Györke (signed)</i> 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>Bagyinszki Csaba</i>					