

Dina Soltani Tehrani

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Education

- 2018–Now **B.Sc. in Electrical Engineering, Communication Technology**, *Electrical Engineering Department, Amirkabir University of Technology, Tehran, Iran.*
– GPA : 3.96/4 (18.22/20)
– Currently studying the last year
- 2016–Now **B.Sc. in Aerospace Engineering**, *Aerospace Engineering Department, Amirkabir University of Technology, Tehran, Iran.*
– GPA : 3.88/4 (18.08/20)
- 2012–2016 **High School Diploma**, *Math and Physics in Theoretical Branch, Tehran, Iran.*
– Total Average : 19.95 on 20

Thesis

- 2020–Now Analytical Derivation of an Electrodynamics Model for Dielectric Barrier Discharge Plasma Actuators With Considering The Metamaterial Properties of The Plasmonic Region
– The purpose is to provide a mathematical model to analytically simulate plasma-based flow control actuators based on the electrodynamic considerations of the plasmonic medium. The objective is to develop the model based on fewer assumptions but more flexible for controlling purposes. My ultimate goal is to engineer the dielectric to make it tunable to specific modes to control the magnitude and the direction of the momentum vector produced by the plasma actuator.

Notable Projects and Researches

Numerical

- 2020–2021 Computational Modelling Of Dielectric Barrier Discharge Plasma Actuators With Considering The Metamaterial Properties Of The Plasma, Comsol Multiphysics
– The purpose was to provide a computational model for the DBD plasma actuators, including the plasma's metamaterial properties. The model solved the governing Poisson's Equation on the considered domain, treating the plasmonic region as a dielectric media with a calculated permittivity representing the plasmonic region under excitation.
- 2020–2021 Implemented the analysis method of arbitrarily oriented microstrip transmission lines in arbitrarily shaped dielectric media on the structure of a DBD plasma actuator, MATLAB
– My purpose was to provide a calculation to obtain the charge densities on the interfaces of a DBD actuator setup, solving one of the two parts of calculating the body force which is produced by the actuator.

- 2020-2021 Implemented Complex Integration Methods and Gaussian Quadratures for the highly oscillatory function of interest, MATLAB, Mathematica
 - My purpose was to numerically find the Inverse Hankel Transform of an electric potential function, representing the Green's Function for a source-embedded two-layered medium with known boundary conditions.
- 2019-2020 Analyzed two cone models with different shape angles and a spherical model, 3D Domain, Supersonic Flow Regime, Comsol Multi-physics
 - The project was to simulate the shock patterns around defined models to explore their 3D physics. Then we used the Schlieren photography method to validate the results of the simulation.
- 2019-2020 Analyzed an RAE airfoil, Transonic Flow Regime, Ansys Fluent
 - The project was to simulate the flow of the RAE2822 airfoil, which has a delta shock within the transonic regime. The position and the power of the shock were captured correctly. I ran the simulation using three methods of k-omega SST, Spalart Almaras, and Transition SST. I got the best result from the latter one for more computation cost. The analysis consisted domain and mesh study, as well.
- 2018-2019 Analyzed the heat transfer of a laptop chip-set, 2D, MATLAB
 - The project was to analyze the heat transfer when having an energy source and defined boundary conditions. I First, simulated the temperature distribution among the laptop chip-set steadily and then extended the simulation to capture its variations in time.

Experimental

- 2020-2021 Flow Visualisation, Epler airfoil (E361), Investigated the effects of vortex generators, **Aerodynamics Research Lab**, Supervisor: Dr.Mani, M.Moeinfar
 - The experiment had two main tasks. First, visualizing the separation bubble at different angles of attack to find out how its place varies to the leading edge. Second, visualizing the effects of vortex generators on the flow and the existence of the separation bubble.
 - My duties were 1.To prepare the non-Newtonian and fluorescent paint, 2.Tuning the airfoil to its right angle, 3.Recording the events during the wind tunnel's test.
- 2019-2020 Investigated the effects of two types of winglets on the aerodynamic performance of a wing with a NACA 64-412 airfoil, **Aerodynamics Research Lab**, Supervisor: Dr.Mani
 - The experiment measured Lift, Drag, and Moment vectors in the low-speed, open-return wind tunnel, first on the model with no winglet and then with two types of winglets implemented. Our purpose was to measure the effect of having the defined winglets on the performance of the wing.
 - My duty was to record the measured data during the test and to provide an analysis of the results afterward.

Research Interests

- Algorithm Development
- Computational Analysis
- Applied Physics

Computer Skills

- Programming** – C++ (Advanced), MATLAB (Advanced), Mathematica (Upper Intermediate), Python (Upper Intermediate), VHDL (Upper Intermediate)
- Computation** – Comsol Multiphysics (Advanced), Ansys Fluent (Advanced), CST Studio Suite (Upper Intermediate), STK (Upper Intermediate), Open Foam (Intermediate)

- General** – Microsoft Office Collection (Skilled), Git (Upper Intermediate), \LaTeX (Intermediate)
– Familiar with PSO and Genetic Algorithms

Honors and Certificates

- 2020-2021 Direct Entry Elected for Masters in Aerospace Engineering, Sharif University of Technology.
2020-2021 Selected as an elite student, Ranked among top 10 % students of the same entry year, Amirkabir University of Technology.
2019-2020 Direct Entry Elected for Masters in Aerospace Engineering, Amirkabir University of Technology.
2019-2020 Ranked 3rd among 100 students of the same entries, Aerospace Engineering Department.
2018-2019 Selected as an elite student, Allowed to take on a second major, Aerospace Engineering Department.

Experiences

- 2020-2021 Researcher at The Compressible Flow Laboratory, Supervisor: Dr.S.Noori, Aerospace Engineering Department, Amirkabir University of Technology, Tehran, Iran
2018-2020 Researcher at The Aerodynamics Research Lab, Supervisor: Dr.M.Mani, Aerospace Engineering Department, Amirkabir University of Technology, Tehran, Iran
2019-2020 Teaching Assistant, Dynamics II, Amirkabir University of Technology, Tehran, Iran

Relevant Courses

- Numerical Analysis
– Computational Fluid Dynamics
– Electromagnetics, Fields and Waves
– Python for Machine Learning and Data Science, **Udemy**, in progress

Publication

- **D.Soltani Tehrani**, G.R.Abdizadeh, S.Noori, "Numerical Electrodynamic Modeling of Plasma-based Flow Control Actuators", (to be submitted).
– **D.Soltani Tehrani**, Gh.Esmaeili, M.Eetesami, "Numerical Study Of Shock Wave Patterns And Interactions With Aerodynamic Models Using Adaptive Grids", (in preparation).

Voluntary Experience

- 2019-2020 Sky-Exploration Tour Guide, Perseid Meteor Shower, Dehnamak Village, Semnan, Iran
2018-2019 Aerodynamic Specialist, Main member of the team for CANSAT competition 2019, Amirkabir University of Technology, Tehran, Iran
2017-2018 Competition Strategist, National Aerup Competition, Amirkabir University of Technology, Tehran, Iran

Language Skills

- English – Excellent command in spoken and written English
– Toefl IBT: Tested on 10/10/2020, 107/120
– Reading: 24, Listening: 28, Speaking: 29, Writing: 26.
Persian – Native