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DR. FAROOQ AHMAD

EDUCATION

Indian Institute of Technology Delhi, India

Post Doc., Department of Applied Mechanics

Nov-2020 to Mar 2022

Indian Institute of technology Delhi, India

Ph.D., Department of Applied Mechanics

Jan-2017 to Oct-2020

School of Aeronautics (Rajasthan Technical University), Neemrana

B. Tech, Aeronautics

Aug-2012 to July-2016

EXPERIENCE

Post-Doctoral Fellow, Indian Institute Technology Delhi

"Development of a software tool for designing optimum Super critical steam turbine cycle",

Nov 2020 to Mar 2022

Lecturer, Institute of Technology, University of Kashmir

Department of Mechanical Engineering

Mar 2022 to Nov 2022

Chief Technology Officer (CTO), Aerofoyl Technologies Private Limited

Nov 2022 to present

PUBLICATIONS (PEER-REVIEWED)

LINEAR STABILITY OF A CONTAMINATED FLUID FLOW DOWN A SLIPPERY INCLINED PLANE

F. A. Bhat, A. Samanta, Phys. Rev. E 98, 033108 (2018), doi.org/10.1103/PhysRevE.98.033108

LINEAR STABILITY ANALYSIS OF A SURFACTANT-LADEN SHEAR-IMPOSED FALLING FILM

F. A. Bhat, A. Samanta, Phys. Fluids 31, 054103 (2019), doi.org/10.1063/1.5093745

LINEAR STABILITY FOR SURFACTANT-LADEN TWO-LAYER FILM FLOWS DOWN A SLIPPERY INCLINED PLANE

F.A. Bhat, A. Samanta, Chem. Eng. Sci. 220, 115611 (2020),doi.org/10.1016/j.ces.2020.115611

LINEAR STABILITY OF A CONTAMINATED TWO-LAYER FILMS FLOWING DOWN A SLIPPERY INCLINED PLANE: PARAMETRIC STUDY AND PHYSICAL MECHANISM

F. A. Bhat, A. Samanta, Phys. Fluids 35, 084109 (2023). doi.org/10.1063/5.0161002

CONFERENCES

LINEAR STABILITY OF A SHEAR IMPOSED FALLING FILM

F. A. Bhat, G. Joshi and A. Samanta, SWAYAM-2018, BITS Pilani, July/2018

MECHANISM OF LONG-WAVE INSTABILITY OF A LIQUID FILM FLOWING DOWN A SLIPPERY INCLINED PLANE

F. A. Bhat, G. Joshi and A. Samanta, FMFP2018, IIT Mumbai, Dec/2018

ACCURATE LONG-WAVE ANALYSIS OF A FALLING FILM DOWN A SLIPPERY PLANE

F. A. Bhat, D. Raj and A. Samanta, ACFM16, JNCASR Bengaluru, Dec 2019.

LINEAR STABILITY OF SHEAR-IMPOSED FLOW DOWN A SLIPPERY INCLINED PLANE

F. A. Bhat, and A. Samanta, XXV ICTAM, Milano, Italy. (Accepted).

AWARDS

4th Position (B. Tech)

1st Position (Open House Poster Presentation. IIT Delhi 2018)

1st Position (Open House Poster Presentation. IIT Delhi 2019)

RESEARCH PROJECTS

Linear Stability of Contaminated flows (PhD. Thesis)

The PhD work focused on the linear stability analysis of surfactant laden falling films. During this research, hydrodynamic stability of single layer and multilayer fluid films was studied under various physical conditions. Further, role of surfactants in stabilizing surface instabilities was also ascertained. In particular, three different, but related, scenarios where considered.

The first part of the study concerns with the linear stability analysis of a fluid flow down a slippery inclined plane when the free surface of the fluid is contaminated by a monolayer of insoluble surfactant. The aim is to investigate the linear stability analysis in detail for low to high values of the Reynolds number in the presence of surface surfactant. Different analytical and numerical methods are employed to tackle the present flow problem.

The second part of the study focuses on the characteristics of stability for a shear-imposed, surfactant laden fluid flowing down an inclined plane. The aim is to study the effect of imposed shear stress on the surface, surfactant, and shear modes appeared in the falling film when the free surface of the film is contaminated by an insoluble surfactant. The linear stability is performed in detailed based on the Orr-Sommerfeld boundary value problem (OS BVP). Further, the physical mechanism of instability is carried out by the method of energy budget.

The final section of the study focuses on the stability analysis of a surfactant laden two-layer fluid flows down a slippery inclined plane. A detailed linear stability analysis is performed to study all the modes of instabilities that arise in the system, in the presence of several flow parameters. For small wave-numbers, analytical longwave analysis and for arbitrary wave-number solutions, numerical methods are used to solve OSBVP. Further surface mode (SM), interface mode (IM) and interfacial surfactant mode (ISM) are

scrutinized separately for their response to changes in density ratio, viscosity ratio thickness ratio, and slip length.

Preliminary Design of Light Combat Aircraft.

Main idea of the project is to prepare a preliminary design of a Light Combat Aircraft from scratch. The requirements for the designing aircraft are those of the Tejas. Tejas serves also as the reference during the design. This project gives a practical description of a preliminary aircraft design sequence. The sequence starts with a preliminary sizing method and ends at completion of baseline design.

The design process covers all the aircraft components: fuselage, wing, empennage and landing gear. The aircraft design sequence defines the cabin layout, the wing parameters, the type of high lift system, the configuration and surface of the empennage. A mass distribution analysis is made, the position of the CG is calculated, and the wing position determined.

It also includes the determination of the aerodynamic and stability parameters of the given aircraft. During the course of this project we have actively used software's like MATLAB, ANSYS, CATIA etc.

BIDs-HBD (BHEL IITD's Heat balance diagram designer

Under the guidance of Professor S. S. Sinha and in association with BHEL (Bharat Heavy Electronics Limited), a software has been developed for designing, solving and optimizing heat balance diagrams of thermal powerplants. The software provides an interactive graphical user interface (GUI) for designing layouts of thermal powerplants of any complexity. In addition, the software also includes a non-linear solver which solves the layout for values of all the required parameters.

This project extensively employed programming in C# and scilab.

RUEB System

Under my supervision, an ecosystem of software, hardware, and electronics is being developed at Aerofoyl Technologies (www.aerofoyl.com), known as the RUEB system. The purpose of this system is to improve and simplify baggage handling processes at airports. The project incorporates the latest advancements in the fields of artificial intelligence (AI), radio frequency identification (RFID), image processing, and cybersecurity to achieve its objectives.

The RUEB system employs programming languages such as Matlab, Javascript, and Python, and integrates hardware devices such as Raspberry Pi and Arduino for instrumentation and hardware integration. By utilizing these tools, the RUEB system is able to effectively address the challenges posed by modern baggage handling systems at airports.

Design and Development of High-Density apple Orchid sprayer.

A consultancy project in which we worked in the development of a remote controlled/ autonomous High-density apple orchid sprayer. This project was floated by "TREE TASK TECHNOLOGIES PRIVATE LIMITED", a startup from Srinagar, J&K. In this project my responsibility was to design a 4 wheel drive electric powered RCV, with capability move on an uneven terrain, sturdy enough to handle farm operational environment, can carry 5-50l of spray tank in addition to its the electronic and mechanical components.

RESEARCH INTERESTS

Aerodynamics
Aircraft Design
Computational Fluid Mechanics
Hydrodynamic Instability
Instrumentation and data analytics

TECHNICAL SKILLS

Programming (C, C++, c#, Java script, Python)
Type setting (MS Word, LATEX)
Specialized Packages (Matlab, Mathematica, Autodesk Inventor).

ABOUT ME

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Srinagar, Jammu and Kashmir (190011)

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