Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : HADJADJ Given names : Abdellah

Status (prof., assistant prof., ...) : Professor

Laboratory : UMR CORIA 6014 Website address : https://www.coria.fr

Institution : INSA ROUEN NORMANDIE Website address : http://insa-rouen.fr/

Scientific competence of the supervisor:

Our research group is dedicated to the development of theoretical and computational modeling and control strategies for complex fluid flows, encompassing laminar, turbulent, and transitional regimes. Our primary focus lies in the developement of computer modeling, simulations, and algorithms, specifically applied to investigating the topology of flow structures in complex media. This includes single and multi-phase flows, with or without heat transfer, as well as energetic systems.

Two major publications in the field proposed for the PhD :

1. Thomine, O., Gai, G., Hadjadj, A., Kudriakov, S. (2021). Phenomenology of a two-phase laminar flame interacting with a heated cylinder. International Journal of Heat & Mass Transfer, 168, 120867
2. Taguelmimt, N. Danaila, L., Hadjadj, A. (2016). Effects of viscosity variations in temporal mixing layer. Flow, Turbulence & Combustion, 96(1), 163-181.

Website address of the personal page :

Supervisor's email : abdellah.hadjadj@insa-rouen.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** II-13

Title : Theoretical and Numerical Investigation of Vortex Generator (VG) Dynamics and Heat Transfer Enhancement in Turbulent Chaotic Flow Regimes

Subject :

This Ph.D. program delves into the complex dynamics of vortex generators (VGs) and their role in enhancing heat transfer within turbulent chaotic flow environments. Through a combination of theoretical analysis and numerical simulations, researchers aim to uncover the fundamental mechanisms governing VG-induced flow dynamics and heat transfer enhancement. Past research has extensively explored computational modeling of vortical structures. Examples include investigating laminar vortex ring evolution and wake structures of micro-ramp vortex generators in bounded flows. Various longitudinal RVG designs have been studied to enhance heat transfer and reduce pumping energy.

The current study focuses on optimizing VG configurations to maximize heat transfer efficiency while minimizing energy consumption. Additionally, model validation and assessement will be conducted to corroborate theoretical and numerical findings. Overall, this study enhances understanding of mass transfer enhancement in mixing fluid flows, offering insights into active and passive methodologies for optimizing energetic processes.

To support this research program, we are looking for an outstanding and highly motivated candidate to pursue his PhD within our group.

Keywords :

Mass Transfer Enhancement ; Mixing Fluid Flows; Vortex Generator Dynamics ; Numerical Simulation

Expected collaborations :

Background required from the applicant :

A Master degree in Fluid Mechanics and Heat Transfer, good knowledge of Applied Mathematics and Fluid Theories

Existence of a PDF file detailing the proposal ("yes" or "no") : YES