ARASH JALIL-KHABBAZI
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Curriculum Vitae

2022-10-25

EDUCATION

University of British Columbia (UBC), Kelowna, BC, Canada — *May 2021 – Present*

- M.A.Sc. in Mechanical Engineering, Thermofluids
  GPA: 4.3/4.3 (94.75/100)
  Thesis: *Numerical and analytical study of green hydrogen integration into the existing low-pressure grids for achieving net-zero GHG emissions by 2050: Case study in British Columbia, Canada*
  Adviser: Sunny-Ri Li

University of Tabriz, Tabriz, EA, Iran — *Sep 2016 – Aug 2020*

- B.Sc. in Mechanical Engineering, Thermofluids
  GPA: 19.12/20 (95.6/100) (4.0/4.0), *Rank: 2^{nd}/124*
  Thesis: Thermodynamic and exergy analysis of Kalina cycle system 11 (KCS11) and a new type with three pressure levels (20/20)
  Adviser: Seyed-Mohammad Seyed-Mahmoudi

Shahid Madani I (NODET), Tabriz, Iran — *Sep 2012 – Sep 2016*

- High School, Mathematics and Physics
  GPA: 19.55/20 (97.75/100)

RESEARCH INTERESTS

- High Performance Computing (HPC)
- Machine Learning Integrated Fluid Dynamics
- Dynamics of Multiphase Flows
- Renewable Energy and Environment
- Multiphase Heat and Mass Transfer

RESEARCH

A. Jalil Khabbazi and R. Li, "Numerical and analytical study of green hydrogen mixing into in the existing grids in British Columbia for reducing GHG emissions", To be submitted at the International Journal of Hydrogen Energy.

- Summary: Studying the integration of generated green hydrogen from renewable sources into the existing grids from CFD and thermodynamics insight. A multi-species approach through ideal and real gas equations of state (EoS), as well as mixing/combining rules, is carried out. ANSYS Fluent is used for the numerical simulation section, and the multi-species codes are developed and compiled separately via C/C++. The impacts of advection, diffusion, and stratification between species are investigated in the analytical part, *(+more)*.

A. Jalil Khabbazi and S. Seyed Mahmoudi, "Thermodynamic and exergy analysis of Kalina cycle system 11 (KCS11) and two other types with three pressure levels", Undergraduate, University of Tabriz, 2020., In Persian, *(EES codes and results)*.

- Summary: Comparing the efficiency of Kalina cycle system 11 (KCS11) and Kalina cycle system 111 (KCS111) based on different decision variables. The results were compared with some benchmarks in the literature. From a thermodynamics perspective, and apart from KCS111's complex configuration and high costs, it is more efficient than the base cycle, KCS11, *(+more)*.

PRESENTATION

A. Khabbazi, R. Li and J. Quinn, "Green Hydrogen Supply to Urban Infrastructure and Buildings through Blending into the Existing Grid", in Conference Abstract. Part of the Proceedings of the Canadian Society for Mechanical Engineering (CSME) International Congress 2022., Edmonton, AB, Canada, p. 1., *(Link)*.

HONORS & AWARDS

- Best Presentation Award at CSME 2022 International Congress, *(Certificate)* — *CSME, 2022*
- Graduate Research Scholarship, 3,000 CAD — *UBC, 2022*
- Graduate Dean's Entrance Scholarship, 5,000 CAD — *UBC, 2021*
- Fully funded graduate student in Mechanical Engineering, 26,000 CAD — *UBC, 2021*
- Merit-based admission to M.Sc. program from distinguished universities of Iran, including, Sharif University of Technology, University of Tehran, and University of Tabriz — *BSc, 2020*
- 2^{nd} place among 124 B.Sc. students of Mechanical Engineering, class 2016 entry — *BSc, 2020*

Teaching Experience

- APSC172 | Engineering Analysis I, *Role: Tutorial instructor*, MASc — *Fall'21, Fall'22*
- ENGR385 | Heat Transfer Applications, *Role: Lab instructor*, MASc — *Winter'22, Winter'23*
- ENGR310 | Fluid Mechanics II, *Role: Lab instructor*, MASc — *Fall'21*
- Thermodynamics II, *Role: Course support*, BSc — *Winter'20*
- Computer Programming (C/C++), *Role: Head tutorial instructor*, BSc — *Fall'18, Winter'19, Fall'19*

Test Score

- TOEFL 107/120 (W:28, S:24, R:28, L:27), obtained in 2020.

Skills

- Technical Software:
  ANSYS Fluent, OpenFOAM, Fluent Meshing, Tecplot, Paraview, Gmsh, CATIA
- Programming:
  Python, C/C++, Matlab, EES, HTML, Git
- Frameworks:
  NumPy, Pandas, SKlearn, SciPy, Matplotlib, Seaborn
- System and computation:
  Linux, High Performance Computing (HPC)

Selected Courses

- Thermofluids

  Multiphase Flows *(A+)* | Directed Studies *(A+)* | Heat Transfer I *(A+)* | Fluid Mechanics I&II *(A+)* | Thermodynamics I&II *(A+)* | Refrigeration Systems *(A+)* | Power Plants *(A+)* | Turbulence *(Winter 2023)*
- Numerical Analysis

  Computational Fluid Dynamics *(A+)* | Fundamentals of CFD *(A+)* | Numerical Computations *(A+)*
- Computers and Systems

  Applied Machine Learning *(Fall 2022)* | Deep and Reinforcement Learning *(Winter 2023)*

Course Project

MASc:

- *Directed Studies:*
  Developing a novel C/C++ code, for compiling to ANSYS Fluent, for Soave-Redlich-Kwong (SRK) Equation of state (EoS) embedded with Van der Waals mixing rules for multi-species mixtures. Some parts of this course's codes were implemented into the MASc thesis *(C/C++ code sample)*.
- *CFD:*
  Carrying out several Python-based mini-projects such as Wave-convection-inviscid-medium and 2D-flow-square-duct as well as OpenFOAM-based ones, including 2D-lid-driven-cavity-flow, Turbulent-flow-backwards-facing-step, Converging-diverging-nozzle, etc. *(Python and OpenFOAM codes)*.
- *Multi-phase Flows:*
  Studying the linear instability of 2-D inviscid liquid sheets through the representation of results in Matlab. The derivation of dispersion relation for both anti-symmetrical and axi-symmetrical disturbances was carried out, and the instability limits and instability growth rate was also studied.
- *Applied Machine Learning:*
  Developing classification algorithms for sorting through raw images (Fall'22).

BSc:

- *Heat Transfer I:*
  Simulation of convection and conduction heat transfer in a section of co/counter-current double pipe heat exchanger with periodic BCs, via ANSYS Fluent and ANSYS Meshing.
- *Fundamentals of CFD:*
  Steady-state 2-D and 3-D simulation of flow across a fin with varying BCs, via ANSYS Fluent and Gambit.
- *Mechanical Parts Desgin I:*
  Design, simulation, and fabrication of an electromechanical lift, via CATIA, C++, ANSYS Mechanical.

- *Refrigeration Systems:*
  Pinch point analysis of several zeotropic refrigerants, via ANSYS Fluent and Matlab NIST REFPROP Database.
- *Design of Mechanisms:*
  Simulation and analysis of a 4-DoF mechanism in a space telescope's base, via EES and Adams software.

Coursera:

- *Machine Learning*
  Deep learning.AI, *in 33 hours*, *(Certificate)*
- *Introduction to Data Science in Python*
  University of Michigan, *in 31 hours*, *(Certificate)*
- *Applied Plotting & Data Representation in Python*
  University of Michigan, *in 21 hours*, *(Python codes)*, *(Certificate)*
- *Python Data Structures*
  University of Michigan, *in 19 hours*, *(Certificate)*

References

Prof. Sunny-Ri Li
Professor of Mechanical Engineering
School of Engineering
The University of British Columbia
Role: Advisor, Instructor, and TA
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Dr. Joshua Brinkerhoff
Associate Professor of Mechanical Engineering
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