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Curriculum Vitae

2022-12-21

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%)
  Thesis: *Numerical and analytical study of green hydrogen supply to urban buildings through the existing grids: A case study in British Columbia for reducing GHG emissions*
  Adviser: Sunny-Ri Li

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

- B.Sc. in Mechanical Engineering, Thermofluids
  GPA: 4.0/4.0 (19.12/20) (95.6%) , *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

A. J. Khabbazi and R. Li, "Green hydrogen mixing and stratification following its introduction into the existing grids for reducing GHG emissions: CFD and analytical study through different equations of state," To be submitted to International Journal of Hydrogen Energy, 2023.

- Summary: Studying the integration of 5-20%mol green hydrogen (obtained from renewable sources) into the existing grids to reduce GHG emissions via CFD and analytical techniques. Multi-species ideal/real gas equations of state (EoS) and mixing/combining rules are developed separately via C/C++ and compiled into ANSYS Fluent. The impacts of flow advection and species diffusion on the stratification of flows are investigated. Different cases are proposed and studied to achieve an immediate uniform mixture following the renewable hydrogen introduction, *(+more)*.

A. Jalil Khabbazi and S. Seyed Mahmoudi, "Thermodynamic and exergy analysis of Kalina cycle system 11 (KCS11) and a new type with three pressure levels", Undergraduate, University of Tabriz, 2020., In Persian, *(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, CAD $3000 — *UBC, 2022*
- Graduate Dean's Entrance Scholarship, CAD $5000 — *UBC, 2021*
- Fully funded graduate student in Mechanical Engineering, CAD $26000/year — *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.
- GRE: Q 166/170, W 4/6, V 147/170, 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 (all A+)

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

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

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

COURSE PROJECT

MASc:

- *Directed Studies:*
  Developing a novel code via C language, compilable to ANSYS Fluent through Linux and Windows, for Soave-Redlich-Kwong (SRK) Equation of state (EoS) included with Van der Waals linear mixing/combining rules for multi-species mixtures. An advanced version was developed and applied into the MASc thesis later on. *(sample codes)*
- *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. *(codes and results)*
- *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:*
  A multi-class classification model was developed, which takes raw Lego images as inputs and classifies them into three different labels. Several pre-processing steps, including cropping, gray scaling, and resizing, were done. To assess the input size effect on the final results, the model was run with different pairs of cropping and scaling values, which affect the input size and the quality of the images.
  (codes and results)

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.

* Mainly covered advanced thermodynamics topics e.g. molecular dynamics, mixing/combining rules, advanced equations of state, etc. (ENGR598E). The relevant course project is described in Course Project section.

- *Fundamentals of CFD:*
  Steady-state 2-D and 3-D simulation of flow across a fin with different boundary conditions
  , 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 base
  , via EES and Adams software.

Coursera:

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