

Yinmin Liu

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SKILLS

PhD student with a strong background in scientific computing for fluid dynamics and chemical kinetics problems.

Expert in Python, C, C++, Julia, MATLAB

PROJECTS

Artificial Neural Networks for Stiff Chemical Kinetics

11/2021 – Present

- Summarized the current efforts on physics-informed machine learning for stiff ODE systems and analyzed the limitations of the conventional ODE solvers
- Leading a research project to solve stiff ODEs efficiently using physics-informed neural networks (PINNs)

Chemical and Astrophysical Skeletal Model Derivation

08/2020 – Present

- Developed and optimized a sensitivity analysis dimension reduction code using Julia language. Reduced the program run time by more than 80%
- Produced skeletal models of methane and JP-10, which are more accurate than all existing reduced models
- Modifying the original Julia code to implement the dimension reduction algorithm on Type Ia supernovae reactions

Differential Equations Integration with Parallel Computing

10/2020 – 12/2020

- Solved a 2D vibration PDE numerically using C/CUDA with 32*32 thread blocks on a cluster v100 GPU
- Solved a 2D heat transfer PDE numerically using MPI library with a 1d domain decomposition method using 16 cores

Reduced Order Modeling for Flow Over a Cylinder

12/2019

- Derived and solved a reduced model of the Navier-Stokes equation with the POD method
- Reduced the original nonlinear PDE into 7 ODEs while the reconstructed result has more than 90% accuracy
- Computed the dynamic mode decomposition (DMD) of the velocity field and performed accurate forecasting

EXPERIENCE

Preh Joyson Automotive Electronics

01/2018 – 05/2018

Test Engineer Intern

Ningbo, China

- Designed and implemented automotive electronic devices testing projects independently, which include tasks like test design, test automation, data acquisition, and failure analysis
- Wrote an operation manual for optical tests
- Worked efficiently in a cross-group and cross-culture environment

EDUCATION

University of Pittsburgh

08/2018 – Present

M.S. & Ph.D. in Mechanical Engineering GPA: 3.85

Pittsburgh, PA

- **Coursework:** Reduced-order Modeling, Machine Learning, Computational Physics, Parallel Computing
- **Research:** Computational fluid dynamics(CFD) Advisor: Dr. Peyman Givi

Chongqing University

09/2013 – 06/2017

B.Eng. in Automotive Engineering

Chongqing, China