

Gengzhi Yang

 Github |  Homepage |  Email

EDUCATION

Fudan University, China

Sep 2019 - Jun 2023(Expected)

B.S. in Mathematics and Applied Mathematics

GPA: 3.58/4.0

Related Courses: *Mathematical Analysis, Real Analysis, Functional Analysis, Linear Algebra, Ordinary Differential Equations, Partial Differential Equations, Numerical Linear Algebra, Numerical Methods to Differential Equations, Optimization, Probability Theory, Numerical Statistics Methods, Approximation Theory.*

PAPERS

ButterflyNet2D: Bridging Classical Methods and Neural Network Methods in Image Processing.

Gengzhi Yang, Yingzhou Li. Preprint submitted to arxiv.

RESEARCH EXPERIENCES

CNN with Fourier transform initialization [[Code](#)]

Sep 2021 - Nov 2022

Advisor: [Yingzhou Li](#)

- Implemented a convolutional neural network structure with sparse channel connection that can be initialized as a Fourier Transform Operator. The architectures are inspired by Butterfly algorithms in dimension 2.
- Analysed the performance of the network on approximation to FT Operator and its inverse;
- Tested the performance of the network on ill-posed image-processing tasks, such as deblurring, denoising, inpainting.
- Arxiv preprint.

Finite Expression Method through Spectral Method [[Code](#)]

Aug 2022 - Present

Advisor: [Haizhao Yang](#) and [Chunmei Wang](#)

- Re-implemented the original FEX [[Code](#)].
- Use FEX to search for basis that can construct the solution of PDEs.
- Used this framework to solve time-related PDEs, such as heat equations.
- Working on Exploring potential structures for FEX inspired by natural architecture search methods.

Butterfly Algorithm in Discretization Invariant Learning

Apr 2022 - Aug 2022

Advisor: [Haizhao Yang](#) and [Chunmei Wang](#)

- Replaced the original dense matrix in IAE-Net with multi-sparse matrices using Butterfly algorithm for a faster running speed.
- Attempted to solve the limited memory problem arised in the framework.
- Use this framework to solve PDEs, such as burgers equation.

PINN: Moving the Residual Points

Sep 2022 - Present

Advisor: [Yingzhou Li](#)

- Compared several strategies that offer sampling methods about residual points.
- Constructed adaptive methods to move the residual points.
- Working on implementing.

TEACHING EXPERIENCES

Teaching Assistant

Calculus, MATH120045.07@Fudan University.

Fall, 2022-2023

AWARDS

- First prize of Fudan University Undergraduate Freshman Scholarship.
- Second Prize in Chinese College Student Mathematical Modeling Contest, Shanghai, China. 2021, 2022.
- Fudan University Undergraduate Academic Scholarship, 2019-2020, 2020-2021, 2021-2022.
- Third prize of Fudan University Undergraduate Scholarship, 2019-2020, 2020-2021, 2021-2022.
- Been elected in Buqing Su Top-notch Talent Program in Mathematics, 2019-2020, 2020-2021.

SKILLS

Programming	MATLAB, Python(Including PyTorch), R, \LaTeX , C.
Languages	Mandarin, Sichuanese, English(TOEFL iBT: 104)