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Work Experience

Research Fellow, National University of Singapore, Singapore

Aug 2020 ~ Present

Mentor: [Zuowei Shen](#)

Education

Ph.D. in Mathematics, National University of Singapore, Singapore

Aug 2016 ~ Aug 2020

Thesis: *Deep neural network approximation via function compositions*

Supervisor: [Zuowei Shen](#) and [Haizhao Yang](#)

B.S. in Mathematics, Wuhan University, China

Sep 2012 ~ Jul 2016

Honors and Awards

The EASIAM (East Asia section of SIAM) Student Paper Prize, 2020 ~ 2021, first prize, [URL](#).

Publications

PhD Thesis

Shijun Zhang. *Deep neural network approximation via function compositions*. PhD Thesis, National University of Singapore. [[URL](#)]

Preprints

- [7] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Deep network approximation: achieving arbitrary accuracy with fixed number of neurons*. submitted. [[arXiv](#)]

Published (Accepted)

- [6] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Optimal approximation rate of ReLU networks in terms of width and depth*. Accepted by [Journal de Mathématiques Pures et Appliquées](#). [[arXiv](#), [URL](#)]
- [5] Jianfeng Lu, Zuowei Shen, Haizhao Yang, Shijun Zhang. *Deep network approximation for smooth functions*. SIAM Journal on Mathematical Analysis, Volume 53, Issue 5, September 2021, Pages 5465–5506. [[arXiv](#), [URL](#)]

- [4] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Neural network approximation: Three hidden layers are enough.* Neural Networks, Volume 141, September 2021, Pages 160-173. [[arXiv](#), [URL](#)]
- [3] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Deep network with approximation error being reciprocal of width to power of square root of depth.* Neural Computation, Volume 33, Issue 4, April 2021, Pages 1005-1036. [[arXiv](#), [URL](#)]
- [2] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Deep network approximation characterized by number of nuerons.* Communications in Computational Physics, Volume 28, Issue 5, November 2020, Pages 1768-1811. [[arXiv](#), [URL](#)]
- [1] Zuowei Shen, Haizhao Yang, Shijun Zhang. *Nonlinear approximation via compositions.* Neural Networks, Volume 119, November 2019, Pages 74-84. [[arXiv](#), [URL](#)]