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Work Experience

Research Fellow, National University of Singapore, Singapore   Jan 2021 ∼ Present

Mentor: Zuowei Shen

Education

Ph.D. in Mathematics, National University of Singapore, Singapore   Aug 2016 ∼ Jan 2021

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]