Tao WEN

tao_wen@mymail.sutd.edu.sg Homepage 65-82272628

EDUCATIONAL BACKGROUND

Singapore University of Technology and Design **Singapore**

MEng. (Research) in Science, Mathematics & Technology GPA: 5.0/5.0 09/2020-Expect 09/2021

Advisor: Professor Kang Hao Cheong

Northwestern Polytechnical University **Xi'an, China**

B. Eng. in Detection, Guidance and Control Technology (System Engineering) GPA: 3.8/4.0 09/2015-07/2019

Advisor: Professor Wen Jiang & Yong Deng

Australian National University **Canberra, Australia**

Summer Session 01/2019-02/2019

RESEARCH PAPERS [Google Scholar] Citation: 182, h-index: 9, i10-index: 9.

* Corresponding Author; † Contribute equally.

2021

1. Yayun Dai, Guangjie Zhan, Ye Ye, Wao Bao, **Tao Wen**, Kang Hao Cheong*, Nenggang Xie*. "Game dynamics of emotion evolution based on the Moran process," *Chaos: An Interdisciplinary Journal of Nonlinear Science*. vol. 31, p. 033153, 2021. [PDF]
2. **Tao Wen**, Kang Hao Cheong*. "The Fractal Dimension of Complex Networks: A Review," *Information Fusion*. vol. 73, pp. 87-102, 2021. [PDF] IF: 13.67

2020

3. Kang Hao Cheong*, **Tao Wen**, Joel Weijia Lai. "Relieving cost of epidemic by Parrondo's paradox: A COVID-19 case study," *Advanced Science*. vol. 7, p. 2002324, 2020. [PDF | Press] IF: 15.84
4. **Tao Wen**, Danilo Pelus, Yong Deng*. "Vital Spreaders Identification in Complex Networks with Multi-Local Dimension," *Knowledge-Based Systems*. vol. 195, p. 105717, 2020. [PDF] IF: 5.92
5. **Tao Wen**, Yong Deng*. "The vulnerability of community structure in complex networks: An entropy approach," *Reliability Engineering & System Safety*. vol. 196, p. 106782, 2020. [PDF] **(ESI Highly Cited Paper)** IF: 5.04
6. **Tao Wen**, Yong Deng*. "Identification of influencers in complex network by local information dimensionality," *Information Sciences*. vol. 512, pp. 549-562, 2020. [PDF] **(ESI Highly Cited Paper)** IF: 5.91

2019

7. **Tao Wen**, Shuyu Duan, Wen Jiang*. "Node similarity measuring in complex networks with relative entropy," *Communications in Nonlinear Science and Numerical Simulation*. vol. 78, p. 104867, 2019. [PDF] IF: 4.11
8. **Tao Wen**, Wen Jiang*. "Identifying influential nodes based on fuzzy local dimension in complex networks," *Chaos, Solitons & Fractals*, vol. 119, pp. 332-342, 2019. [PDF]
9. **Tao Wen**, Wen Jiang*. "Measuring the complexity of complex network by Tsallis entropy," *Physica A: Statistical Mechanics and Its Applications*. vol. 526, p. 121054, 2019. [PDF]
10. Shuyu Duan, **Tao Wen**, Wen Jiang*. "A new information dimension of complex network based on Rényi entropy," *Physica A: Statistical Mechanics and Its Applications*, vol. 516, pp. 529–542, 2019. [PDF]

2018

11. **Tao Wen**, Moxian Song, Wen Jiang*. "Evaluating topological vulnerability based on fuzzy fractal dimension," *International Journal of Fuzzy Systems*, vol. 20, pp. 1956–1967, 2018. [PDF]
12. **Tao Wen**, Wen Jiang*. "An information dimension of weighted complex networks," *Physica A: Statistical Mechanics and Its Applications*, vol. 501, pp. 388 – 399, 2018. [PDF]

Conference paper

13. **Tao Wen**, Shuyu Duan, Wen Jiang*. "Forecasting time series based on visibility graph and relative entropy," *The Ninth Chinese Information Fusion Conference*, Taiyuan, Oct. 2019. (In Chinese)
14. Shuyu Duan, **Tao Wen**, Xinyang Deng, Wen Jiang*. "Identifying influential nodes based on Tsallis entropy and information dimension," *The Ninth Chinese Information Fusion Conference*, Taiyuan, Oct. 2019. (In Chinese)
15. Shuai Xu, Zichang He, **Tao Wen**, Wen Jiang*. "A Physarum-inspired Model for the Path Planning of Uninhabited Combat Air Vehicle," *The Eighth Chinese Information Fusion Conference*, Xi'an, July, 2018. (In Chinese)

Paper submitted to Journal

16. **Tao Wen**, Kang Hao Cheong*, Jinde Cao. "Gravity-based Community Vulnerability Evaluation Model in Social Networks: GBCVE," *IEEE Transactions on Cybernetics*. Third Revision.
17. **Tao Wen**, Eugene V. Koonin, Kang Hao Cheong*. "Alternating active-dormitive strategy enables overtaking by disadvantaged prey through Parrondo's paradox," *BMC Biology*. Second Revision.
18. **Tao Wen**, Joel Weijia Lai, Kang Hao Cheong*. "Can you profit from two losing stocks? An empirical analysis," *Chinese Journal of Physics*. Under Review.
19. Kang Hao Cheong*†, **Tao Wen**†, Sean Benler, Eugene V. Koonin*. "Alternating lysis and lysogeny is a winning strategy in bacteriophages due to Parrondo's Paradox," *eLife*. Under Review.
20. Zeyi Liu†, **Tao Wen**†, Yong Deng*, Hamido Fujita. "Cooperation-guided Experts Importance Identification Model with Fuzzy Framework: A Network Design," *IEEE Transactions on Cybernetics*. Under Review.
21. Qiuya Gao, **Tao Wen**, Xiangfeng Dai, Mengge Chai, Kang Hao Cheong*, Zhen Wang*. "Measuring Similar Nodes in Complex Networks based on Gravity Model," *Information Sciences*. Under Review.
22. **Tao Wen**, Yong Deng*. "Information Volume Fractal Dimension". Prepare to submit.
23. **Tao Wen**, Yong Deng*. "Information Volume Multifractal Dimension". Prepare to submit.

RESEARCH EXPERIENCE

Analyzing the Parrondo's paradox phenomenon in complex networks Jan. 2020 – Now

Singapore University of Technology and Design, Advisor: Professor Kang Hao Cheong

- Explored the increase in economic and health cost caused by different strategies (open community & lockdown) under the epidemic of COVID-19, but the loss can be controlled by taking alternating strategies based on time-based and result-based switching scheme – a phenomenon attributed to Parrondo's paradox.
- Reviewed the development and progress of fractal characteristics in the network systematically, including network covering, various concepts of dimensions, and their real-world applications.

Finding Important Properties of Nodes and Communities in Complex Networks June 2019 – Sep. 2019

University of Electronic Science and Technology of China, Advisor: Professor Yong Deng

- Combined the internal factors and external factors of community to measure the vulnerability of each community and improved the recognition accuracy in real-world network applications via the entropy-based method.
- Collected the personal opinion of each expert by 2-order additive fuzzy measure and identified the most important expert after constructing the expert network based on their relationships, thereby solving group decision-making problems without sufficient information.

Network mining: Exploring the Properties of Networks by Applying Different Dimension May 2016 – June 2019

Northwestern Polytechnical University, Advisor: Professor Wen Jiang & Yong Deng

- Promoted information dimension and Rényi dimension into weighted complex networks and explored the fractal and self-similarity properties of complex networks.
- Developed several recognition models based on the dimension of the network to solve practical problems, such as measuring the complexity and vulnerability of airline networks, as well as identifying the similarity and importance of individuals.

Evaluating Topological Vulnerability of Networks Based on Fuzzy Fractal Dimension May 2017 – May 2018

Team Leader, National Undergraduate Training Programs for Innovation and Entrepreneurship (￥ 20, 000)

An Autonomous Landing Scheme for Cargo Drone Based on Computer Vision May 2017 – May 2018
Researcher, National Undergraduate Training Programs for Innovation and Entrepreneurship (￥ 20, 000)

Exploring the Composition and Future Scalability of Smart House Jan. 2019 – Feb. 2019
Australian National University, Summer Session Course Project

HONORS AND AWARDS

[Sep. 2020] Singapore University of Technology and Design MEng (Research) Fellowship (S$ 1500 / month)

[Nov. 2019] The "Challenge Cup" National Undergraduate Extracurricular Academic Science and Technology Contest: **Special First Prize** (**Top 4%**)

Highest award in the field of information science in natural science papers.

The "Challenge Cup" is the **highest academic science and technology competition** in China.

[May 2019] The "Challenge Cup" National Undergraduate Extracurricular Academic Science and Technology Contest in Shaanxi Area: **Outstanding Winner** (**TOP 5%**)

Best grade in the field of natural science papers in Northwestern Polytechnical University **so far**.

[Sep. 2018] **Outstanding Student Pacemaker in Northwestern Polytechnical University** (**TOP 0.1%**)

Only **10 undergraduates** are awarded among more than 12,000 undergraduates in NWPU in 2018.

[Sep. 2018] **China National Scholarship** (**Top 1%**)

Highest honor for students' year achievement in the School of Electronics and Information.

[Feb. 2018] Global Mathematical Contest in Modeling: **Meritorious Winner**

[Oct. 2017] Mathematical Contest in Modeling for Chinese Undergraduate Students in Shaanxi Area: **First Prize**

[Sep. 2017] Second Prize scholarship of AVIC Optronics Institute (**TOP 5%**)

[Sep. 2017] First Prize scholarship of Northwestern Polytechnical University (**TOP 10%**)

[Feb. 2017] Global Mathematical Contest in Modeling: **Honorable Mention**

ACADEMIC SERVICE

- Talk at the Oberseminar Dynamics Seminar in Technical University of Munich (Online).
- Conference talks at Ninth China Information Fusion Conference, Taiyuan, China.
- Teaching assistant of 10.018 (Modelling Space and Systems), SUTD.
- Independent reviewer for:
  - *Communications Physics*
  - *IEEE Transactions on Signal and Information Processing over Networks*
  - *International Journal of Intelligent Systems*
  - *Physica A: Statistical Mechanics and Its Applications*

EXTRACURRICULAR ACTIVITIES

- Volunteer of *International Conference on Intelligent Unmanned System* (2018).
- Volunteer of *Northwestern Polytechnical University 80th Anniversary*.

SKILLS

Technical: MATLAB, Python, C language, LaTeX, Gephi, Origin, Visio.
Languages: Mandarin, English (TOEFL 98).

Last updated: April 18, 2021