



北京大学数学科学学院
School of Mathematical Sciences
Peking University

ANNUAL REPORT 2021

领导致辞 Dean's Message

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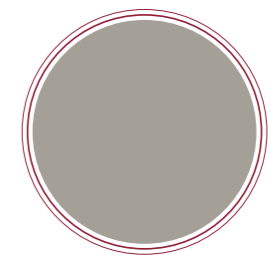
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2021 12 31

目录 Contents

Annual Report
School of Mathematical
Sciences

2021

01

Highlights

06

02

Honor Roll

10

03

Faculty

16

04

Education

22

05

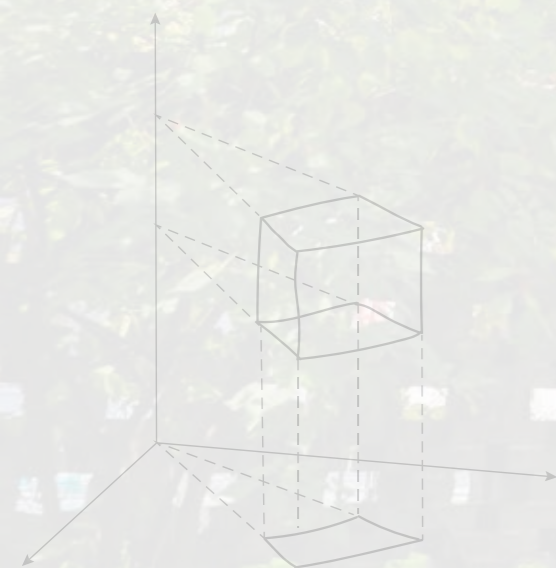
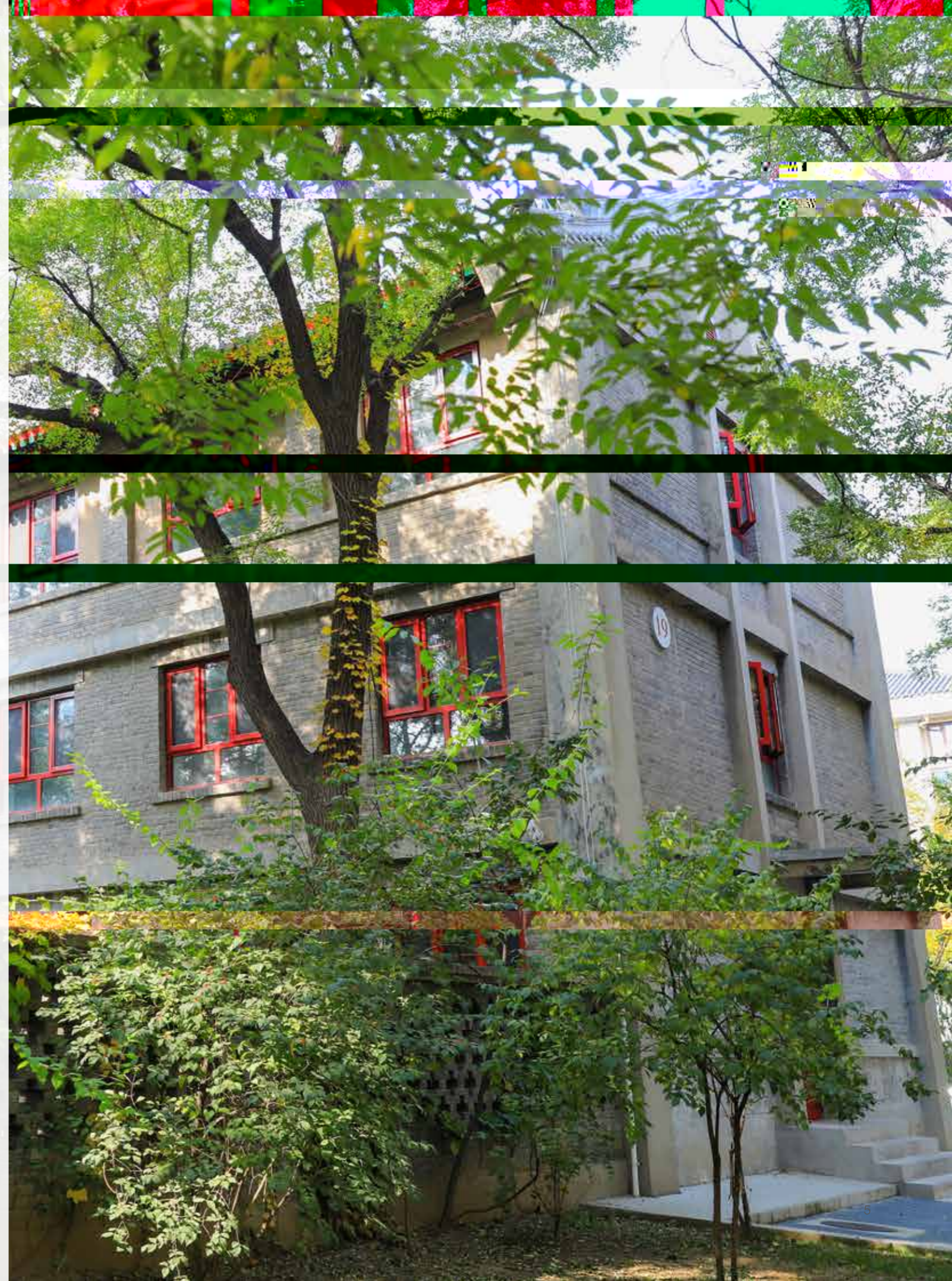
Research

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Supports

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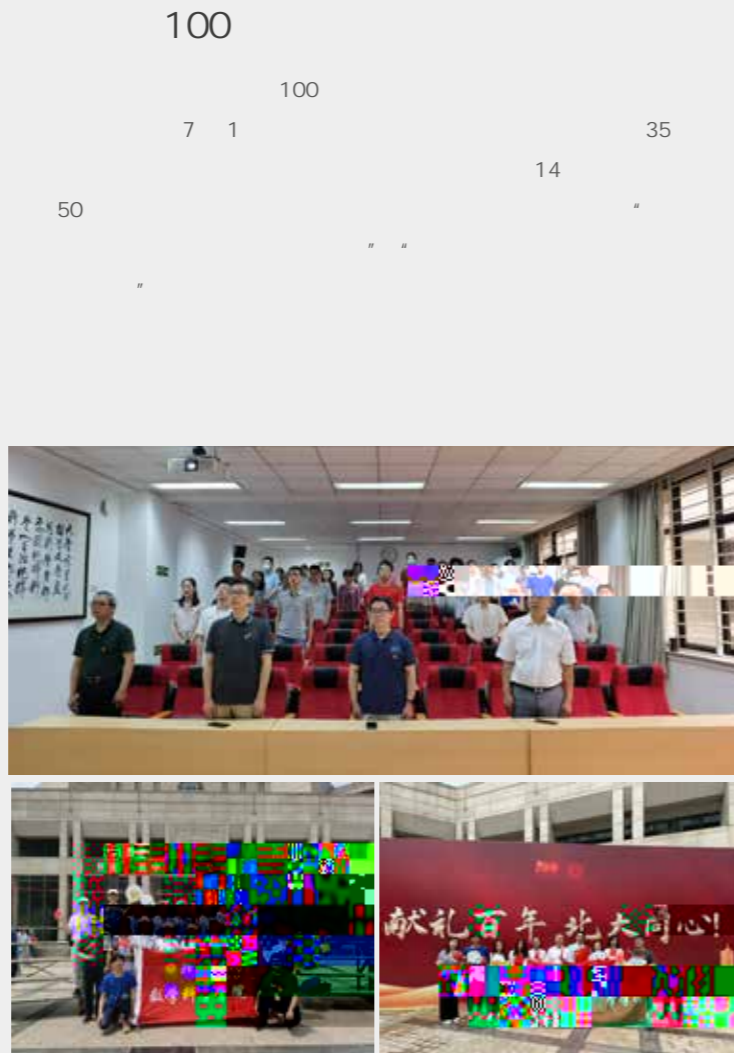


Highlights

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School of Mathematical
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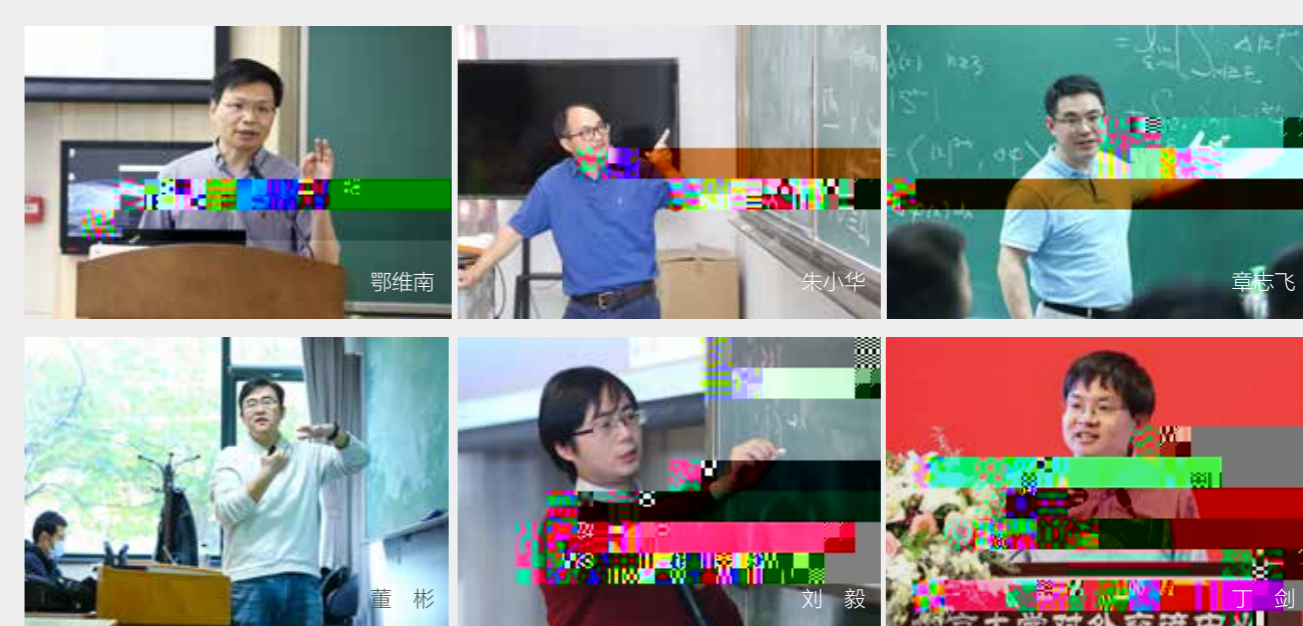
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$$\cos^2 \alpha + \sin^2 \alpha = 1$$



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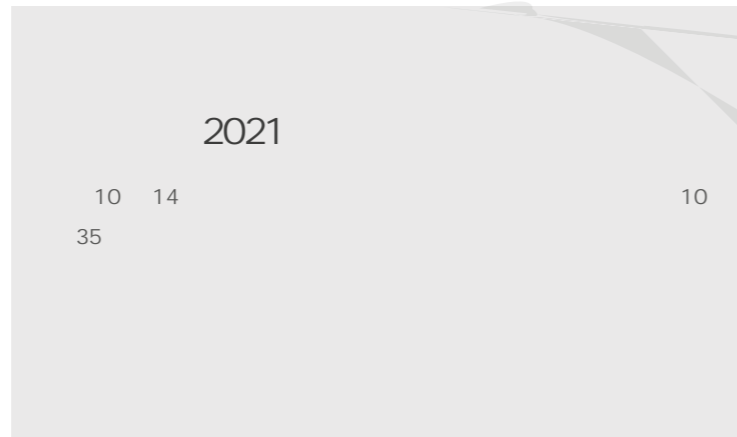


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$$\cos^2 \alpha + \sin^2 \alpha = 1$$



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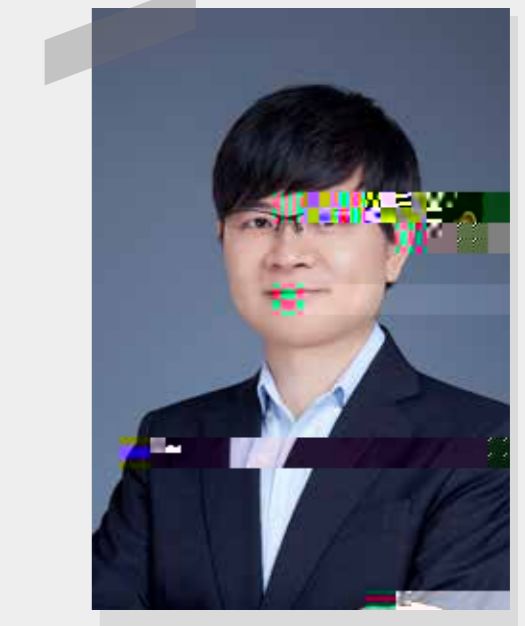
Kleinman Theodore von Karman SIAM
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Fellowship, NSF Career Award 2022
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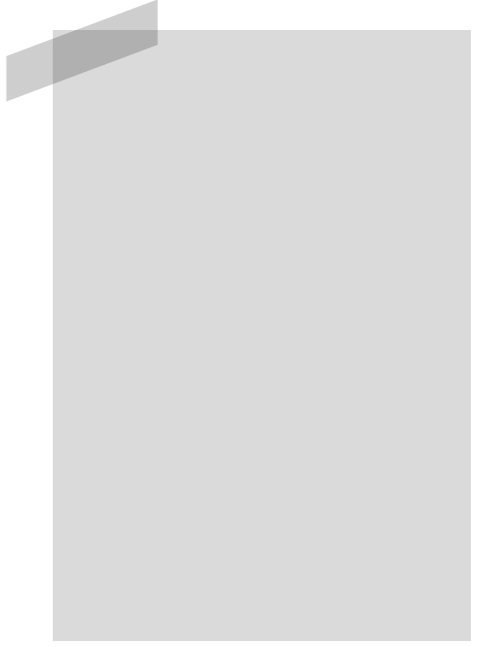
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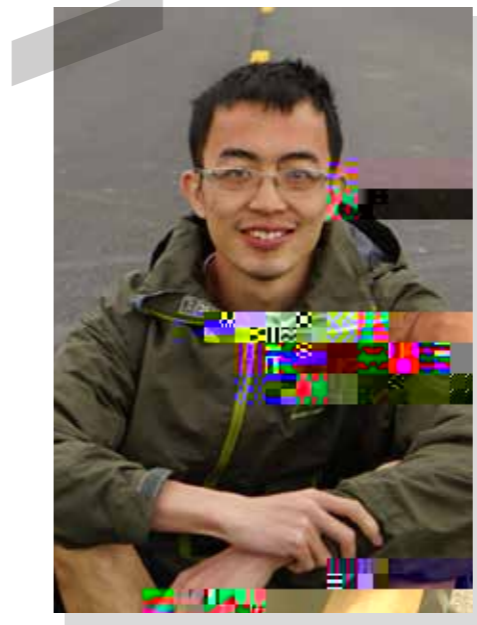


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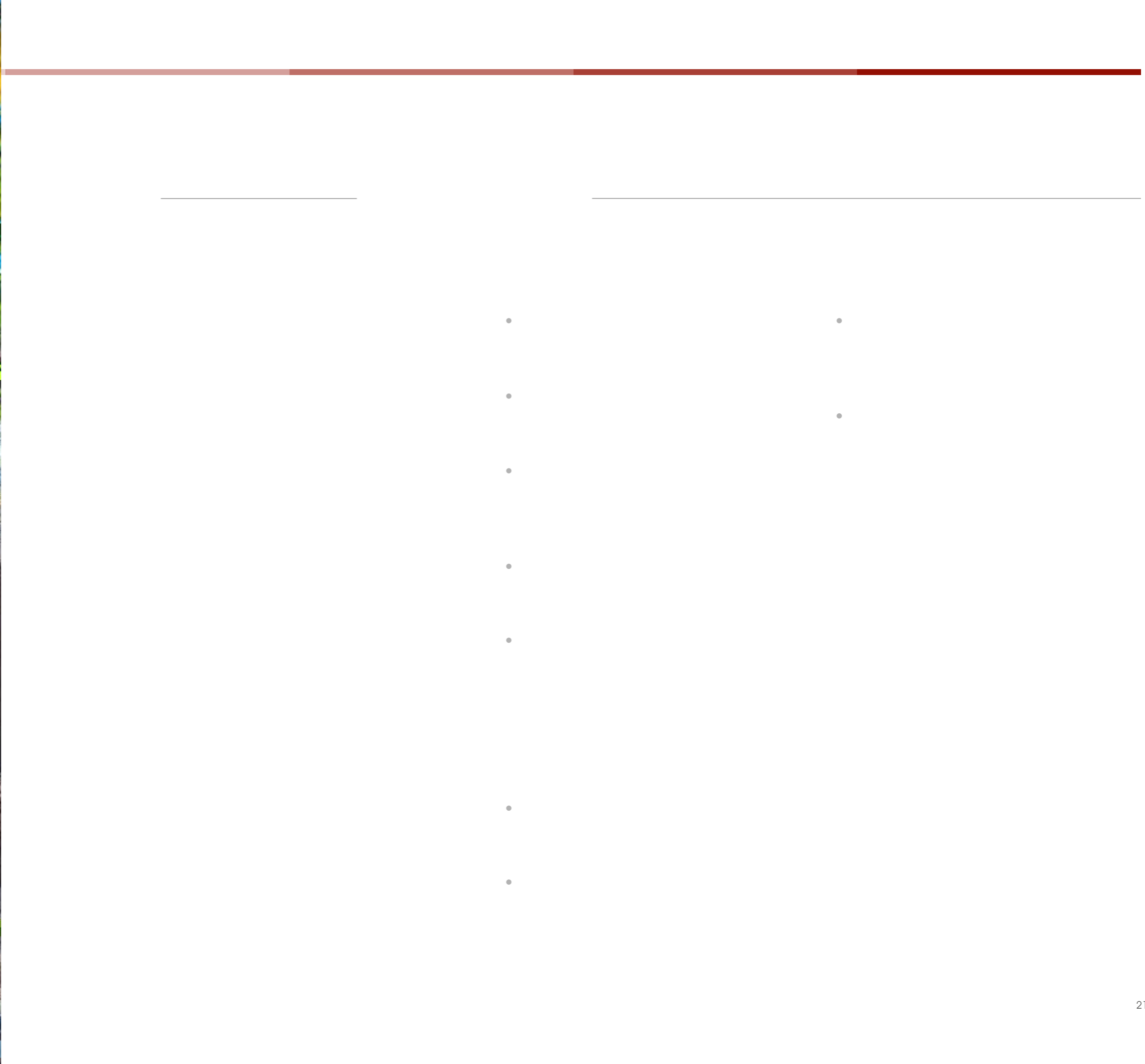
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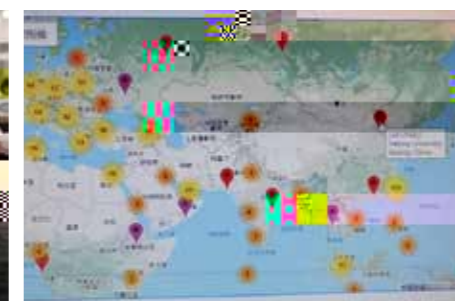
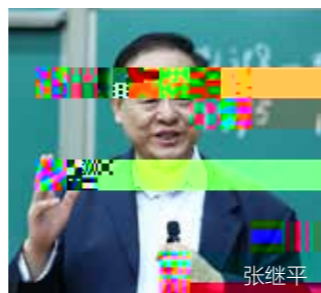
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7		(B)	30		II	53		
8		(B)	31		II	54		
9		(B)	32		II	55		
10		(B)	33		II	56		
11		(B)	34		II	57		
12		(B)	35		II	58		
13		(B)	36		II	59		
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22		(B)	46		I	68		(B)	92		I	116			139		
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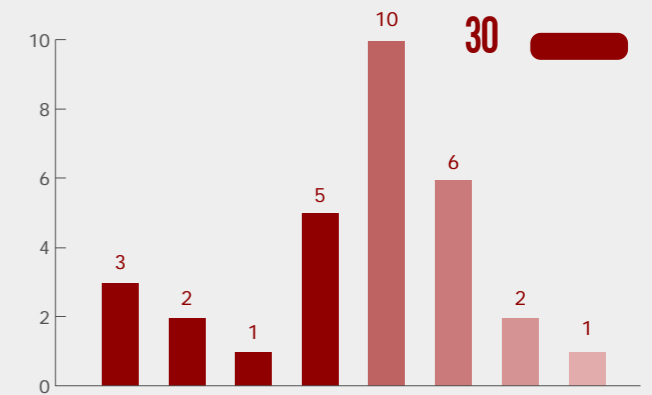
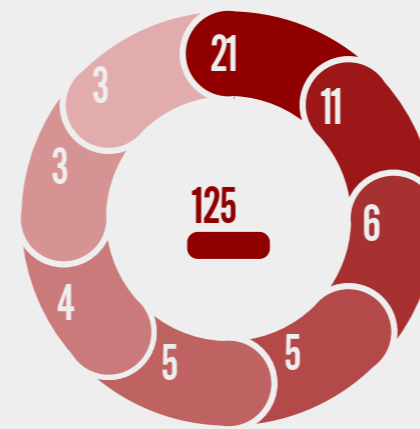
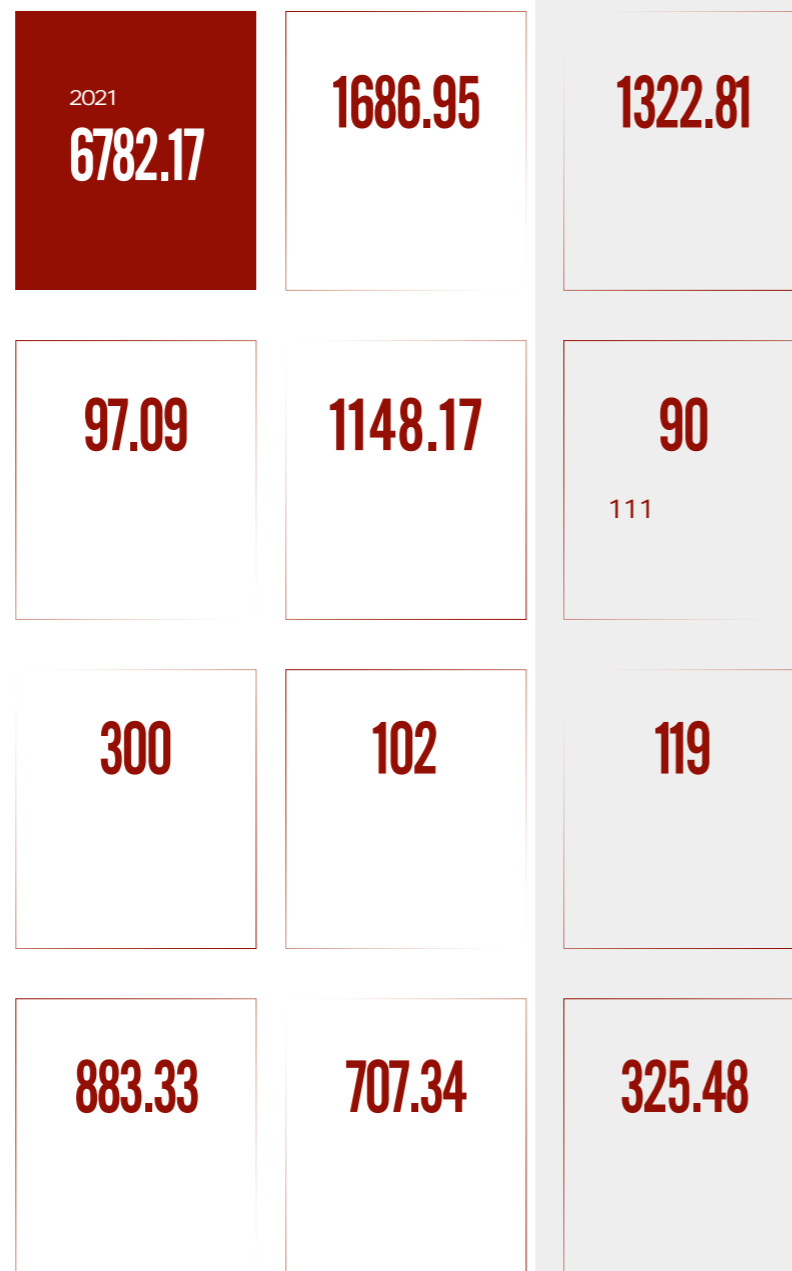
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9		270			2018.01	2022.12
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, ISBN: 9787301323502
, ISBN: 9787301328637

ISBN: 9789811252549

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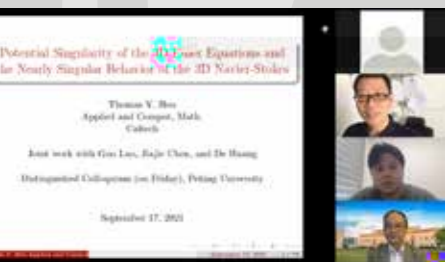
- **An, Jinpeng;** Guan, Lifan; Marnat, Antoine; Shi, Ronggang, Divergent trajectories on products of homogeneous spaces, *Advances in Mathematics* 390 (2021), Paper No. 107910, 33 pp.
- Chang, Huailiang; **Guo, Shuai;** Li, Jun, Polynomial structure of Gromov-Witten potential of quintic 3-folds, *Annals of Mathematics* 194 (2021), no. 3, 585-645.
- Chang, Huailiang; **Guo, Shuai;** Li, Jun; Li, Weiping, The theory of N -mixed-spin- P fields, *Geometry & Topology* 25 (2021), no. 2, 775-811.
- Chodosh, Otis; Eichmair, Michael; **Shi, Yuguang;** Yu, Haobin, Isoperimetry, scalar curvature, and mass in asymptotically flat Riemannian 3-manifolds, *Communications on Pure and Applied Mathematics* 74 (2021), no. 4, 865-905.
- Feichtinger, Hans G.; Groechenig, Karlheinz; Li, Kuijie; **Wang, Baoxiang,** Navier-Stokes equation in super-critical spaces $E_{p,q}^s$, *Annales de l'Institut Henri Poincaré-Analyse Non Linéaire* 38 (2021), no. 1, 139-173.
- Feng, Renjie; **Wei, Dongyi,** Small gaps of circular Beta-Ensemble, *Annals of Probability* 49 (2021), no. 2, 997-1032.
- **Fu, Jingxue; Wu, Lan,** Regime-switching herd behavior: Novel evidence from the Chinese A-share market, *Finance Research Letters* 39 (2021).
- Hammerlindl, Andy; **Shi, Yi,** Accessibility of derived-from-Anosov systems, *Transactions of the American Mathematical Society* 374 (2021), no. 4, 2949-2966.
- **Hu, Jun; Liang, Yizhou,** Conforming discrete Gradgrad-complexes in three dimensions, *Mathematics of Computation* 90 (2021), no. 330, 1637-1662.
- Jin, Fangzhou; **Yang, Enlin,** Kuneth formulas for motives and additivity of traces, *Advances in Mathematics* 376 (2021), Paper No. 107446, 83 pp.
- Kong, Liang; Yuan, Wei; **Zheng, Hao,** Pointed Drinfeld center functor, *Communications in Mathematical Physics* 381 (2021), no. 3, 1409-1443.
- Le, Nam Q.; **Zhou, Bin,** Solvability of a class of singular fourth order equations of Monge-Ampere type, *Annals of Partial Differential Equations* 7 (2021), no. 2.
- **Li, Dingquan;** Jiang, Tingting; **Jiang, Ming,** Unified quality assessment of in-the-wild videos with mixed datasets training, *International Journal of Computer Vision* 129 (2021), no. 4, 1238-1257.
- **Li, Ruo;** Li, Weiming; **Zheng, Lingchao,** Direct flux gradient approximation to moment closure of Kinetic equations, *SIAM Journal on Applied Mathematics* 81 (2021), no. 5, 2153-2179.
- **Li, Tao;** Wu, Di; **Ma, Jinwen,** Mixture of robust Gaussian processes and its hard-cut EM algorithm with variational bounding approximation, *Neurocomputing* 452 (2021), 224-238.
- Li, Wei; **Geng, Zhi;** Zhou, Xiao-Hua, Causal mediation analysis with sure outcomes of Random events model, *Statistics in Medicine* 40 (2021), no. 17, 3975-3989.
- Lin, Zhenhua; **Yao, Fang,** Functional regression on the manifold with contamination, *Biometrika* 108 (2021), no. 1, 167-181.
- Lo, Andrew W; **Zhang, Ruixun,** The evolutionary origin of Bayesian heuristics and finite memory, *iScience* 24(2021), no. 8.
- **Ren, Yan-Xia;** Song, Renming; Zhang, Rui, The extremal process of super-Brownian motion, *Stochastic Processes and Their Applications* 137 (2021), 1-34.
- **Shen, Shunlin,** The rigorous derivation of the T^2 focusing cubic NLS from 3D, *Journal of Functional Analysis* 280 (2021), no. 8.
- Shen, Weiming; Wang, Yue; **Zhang, Zhifei,** Boundary layer separation and local behavior for the steady Prandtl equation, *Advances in Mathematics* 389 (2021).
- Wang, Feng; **Zhu, Xiaohua,** Tian's partial C^0 -estimate implies Hamilton-Tian's conjecture, *Advances in Mathematics* 381 (2021).
- Wang, Wei; Zhang, Lei; **Zhang, Pingwen,** Modelling and computation of liquid crystals, *Acta Numerica* 30 (2021), 765-851.
- Wang, Yue; **Zhang, Zhifei,** Global C^∞ regularity of the steady Prandtl equation with favorable pressure gradient, *Annales de l'Institut Henri Poincaré-Analyse Non Linéaire* 38 (2021), no. 6, 1989-2004.
- **Wei, Dongyi;** Yang, Shiwu, Asymptotic decay for defocusing semilinear wave equations in \mathbf{R}^{1+1} , *Annals of Partial Differential Equations* 7 (2021), no. 1.
- **Wei, Dongyi;** Yang, Shiwu, On the 3D Relativistic Vlasov-Maxwell System with large Maxwell field, *Communications in Mathematical Physics* 383 (2021), no. 3, 2275-2307.
- **Wu, Yan;** Wu, Jiaqi; **Deng, Minghua;** Lin, Yihan, Yeast cell fate control by temporal redundancy modulation of transcription factor paralogs, *Nature Communications* 12 (2021), no. 1.
- **Xia, Mingtao; Shao, Sihong;** Chou, Tom, Efficient scaling and moving techniques for spectral methods in unbounded domains, *SIAM Journal on Scientific Computing* 43 (2021), no. 5, A3244-A3268.
- Xiao, Jianyuan; Chen, Junshi; **Yang, Chao;** et al., Symplectic structure-preserving particle-in-cell whole-volume simulation of Tokamak plasmas to 111.3 trillion particles and 25.7 billion grids, Proceedings of SC 2021: the International Conference for High Performance Computing, *Networking, Storage and Analysis: Science and Beyond*, 2:1-13, 2021.
- Xie, Zhenxiao; Li, Tongzhu; **Ma, Xiang;** Wang, Changping, Wintgen ideal submanifolds: New examples, frame sequence and Mobius homogeneous classification, *Advances in Mathematics* 381 (2021).
- Yan, Han; Zhu, Yuru; Gu, Jia; Huang, Yaxuan; Sun, Haoxuan; Zhang, Xinyu; Wang, Yuqing; Qiu, Yumou; **Chen, Song Xi,** Better strategies for containing COVID-19 pandemic: A study of 26 countries via a Vsiadr model, *Proceedings of the Royal Society A-Mathematical Physical and Engineering Sciences* 477 (2021), no. 2248.
- **Yang, Qi;** Zong, Chuanming, Characterization of the two-dimensional fvefold translative tiles, *Bulletin de la Societe Mathematique de France* 149 (2021), no. 1, 119-153.
- Ye, Haishan; Luo, Luo; **Zhang, Zhihua,** Approximate newton methods, *Journal of Machine Learning Research* 22 (2021).
- **Yin, Jianyuan;** Jiang, Kai; Shi, An-Chang; **Zhang, Pingwen;** Zhang, Lei, Transition pathways connecting crystals and quasicrystals, *Proceedings of the National Academy of Sciences of the United States of America* 118 (2021), no.49.

477 (2021), no. 2248. 118 (2021), no.49. 137 (2021), 1-34. 280 (2021), no. 8. 389 (2021). 381 (2021). 30 (2021), 765-851. 38 (2021), no. 6, 1989-2004. 7 (2021), no. 1. 383 (2021), no. 3, 2275-2307. 12 (2021), no. 1. 43 (2021), no. 5, A3244-A3268. 2:1-13, 2021. 381 (2021). 477 (2021), no. 2248. 149 (2021), no. 1, 119-153. 22 (2021). 118 (2021), no.49.

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01.14- 12.02	Beijing- Saint Petersburg Mathematics Colloquium (online)	100
01.15- 12.03	Beijing- Moscow Mathematics Colloquium (online)	100
01.21- 12.02	Beijing- Novosibirsk seminar on geometry and mathematical physics online seminar	100
04.24	2021 PKU- POSTECH SIAM Student Forum (Online)	50
05.06		30
07.07	Geometric analysis and nonlinear PDE	40
07.12- 08.06	2021 * *	80
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