Publications for Merit Review

Xin Guo

(** Asterisks indicate new publications since 2022, * Asterisks indicate new publications between 2013 and 2022).

I. Refereed Publications

A. Archival Journals

I.A.1. X. Guo. "Cesàro summability of Fourier series under the critical index on unitary groups," *Chinese Annals of Mathematics,* 15A(4):386–395, 1994. Also in *Chinese Journal of Contemporary Mathematics,* 15(3):215–226, 1994.

I.A.2. Q. Yu, S. Gong, and X. Guo. "Schwarzian derivative of holomorphic mappings," *Singularities and complex geometry* (Q. Lu, S. S. T. Yau, and A. Libgober, eds.), *AMS/IP Studies in Advanced Mathematics,* 5:317–323, 1997.

I.A.3. X. Guo. "Information and option pricings," *Quantitative Finance,* 1:38–44, 2001.

I.A.4. X. Guo. "An explicit solution to an optimal stopping problem with regime switching," *Journal of Applied Probability,* 38(2):464–481, 2001.

I.A.5. X. Guo and L. Shepp. "Some optimal stopping problems with non-trivial boundaries for pricing exotic options," *Journal of Applied Probability,* 38(3):647–658, 2001.

I.A.6. X. Guo. "When the 'bull' meets the 'bear'—A first passage time problem for a hidden Markov process," *Methodology and Computation in Applied Probability,* 3(2):135–143, 2001.

I.A.7. X. Guo. "An optimal strategy for sellers in an online auction," *ACM Transactions on Internet Technology,* 2(1):1–13, February, 2002.

I.A.8. X. Guo. "Some risk management problems for firms with internal competition and debt," *Journal of Applied Probability,* 39(1):55–69, 2002.

I.A.9. X. Guo. "Option pricings in an incomplete market with regime switching," *Proc. of the Steklov Institute of Mathematics*, 237:192–202, 2002.

I.A.10. X. Guo and Q. Zhang. "Closed-form solutions for perpetual American put options with regime switching," *SIAM Journal on Applied Mathematics*, 64(6):2034–2049, 2004.

I.A.11. X. Guo, J. Liu, and X. Y. Zhou. "A constrained non-linear regular-singular stochastic control problem, with applications," *Stochastic Processes and Their Applications*, 109(2):167–187, 2004.

I.A.12. X. Guo and H. Pham. "Optimal partially reversible investment with entry decision and general production function," *Stochastic Processes and Their Applications*, 115(5):705–736, 2005.

I.A.13. A. Banerjee, X. Guo, and H. Wang. "On the optimality of conditional expectation as a Bregman predictor," *IEEE Transactions on Information Theory*, 51(7):2664–2669, July, 2005.

I.A.14. X. Guo, J. J. Miao, and E. Morellec. "Irreversible investment with regime shifts," *Journal of Economic Theory*, 122(1):37–59, 2005.

I.A.15. X. Guo and J. Liu. "Stopping at the maximum of geometric Brownian motion when signals are received," *Journal of Applied Probability*, 42(3):826–838, 2005.

I.A.16. X. Guo and Q. Zhang. "Optimal selling rules in a regime switching model," *IEEE Transactions on Automatic Control*, 50(9):1450–1455, September, 2005.

I.A.17. X. Guo and G. Yin. "The Wonham filter with random parameters: Rate of convergence and error bounds," *IEEE Transactions on Automatic Control*, 51(3):460–464, 2006.

I.A.18.X. Guo and P. Tomecek. "Solving singular control from optimal switching," Asia-Pacific Financial Market, 2008.

I.A.19. X. Guo and Y. Zeng. "Intensity process and compensator: A new filtration expansion approach and the Jeulin–Yor theorem," *The Annals of Applied Probability*, 18(1):120–142, 2008.

I.A.20. X. Guo and P. Tomecek. "Connections between singular control and optimal switching," *SIAM Journal on Control and Optimization*, 47(1):421–443, 2008.

I.A.21. X. Guo, R. A. Jarrow, and H. Z. Lin, "Distressed debt prices and recovery rate estimation," *Review of Derivatives Research*, 11(3):171–204, 2008.

I.A.22. X. Guo and P. Tomecek. "A class of singular control problems and the smooth fit principle," *SIAM Journal on Control and Optimization*, 47(6):3076–3099, 2009.

I.A.23. X. Guo, R. A. Jarrow, and Y. Zeng. "Modeling the recovery rate in a reduced form model," *Mathematical Finance,* 19(1):73–97, 2009.

I.A.24. X. Guo, R. A. Jarrow, and Y. Zeng. "Credit risk models with incomplete information," *Mathematics of Operations Research*, 34(2):320–332, 2009.

I.A.25. X. Guo and G. L. Wu. "Smooth fit principle for impulse control of multidimensional diffusion processes," *SIAM Journal on Control and Optimization*, 48(2):594–617, 2009.

I.A.26. M. A. Davis, X. Guo, and G. L. Wu. "Impulse controls for multidimensional jump diffusions," *SIAM Journal on Control and Optimization*, 48(8):5276–5293, 2010.

I.A.27. X. Guo and M. Zervos. "π options," *Stochastic Processes and Their Applications*, 120:1033–1059, 2010.

I.A.28. X. Guo, P. Kaminsky, P. Tomecek, and M. Yuen. "Optimal spot market inventory strategies in the presence of cost and price risk," *Mathematical Methods of Operations Research*, 73:109–137, 2011.

I.A.29. I. O. Filiz, X. Guo, J. Morton, and B. Sturmfels. "Graphical models for correlated defaults," *Mathematical Finance*, 22(4):621–644, 2012.

(*) I.A.30. Y-S. A. Chen and X. Guo. "Impulse control of multidimensional jump diffusions in finite time horizon," *SIAM Journal on Control and Optimization*, 51(3):2638–2663, 2013.

(*) I.A.31. X. Guo. "Optimal placement in a limit order book." *TUTORIALS in Operations Research, INFORMS*, 2013.

(*) I.A. 32. X. Guo, R. A. Jarrow, and A. de Larrard. "Economic default time and the arcsine law." *Journal of Financial Engineering*, 1(3), 1450025, 2014.

(*) I.A.33. X. Guo and M. Zervos. "Optimal execution with multiplicative price impact," *SIAM Journal on Financial Mathematics,* 6(1), 281-306, 2015.

(*) I.A.34. X. Guo, A. de Larrard, and Z. Ruan. "Optimal placement in a limit order book, an analytical approach." *Mathematics and Financial Economics*, 11(2), 189-213, 2017.

(*) I.A.35. X. Guo, C. Pan, and S. G. Peng. "Martingale problem under non linear expectations", *Mathematics and Financial Economics*, 12, 135-164, 2018.

(*) I.A.36. X. Guo, and C. Pan. "Ito's calculus in a sublinear expectation space via regularity of PDEs and rough path." *Stochastic Processes and Their Applications*, 11(2), 1711-1749, 2018.

(*) I.A.37. X. Guo and R. Y. Xu. "Stochastic games for the fuel follower problem, N vs MFG." *SIAM Journal on Control and Optimization*, 57(1), 659–692, 2019.

(*) I.A.38. B. S. Li, et al. Ultrasensitive detection of circulating tumour DNA via deep methylation sequencing aided by machine learning. *Nature, Biomedical Engineering*, 5 (6), 586-599, 2021.

(*) I.A. 39. R. Cont, X. Guo and R. Y. Xu. "Interbank lending with benchmark rates: Pareto optima for a class of singular control games." *Mathematical Finance*, 31 (4), 1357-1393, 2021.

(*) I.A. 40. H. T. Gu, X. Guo, X.L. Wei, and R. X. Xu, "Mean-field controls with Q-learning for cooperative MARL: convergence and complexity analysis." *SIAM Journal on Mathematics of Data Science*, 3 (4), 1168-1196, 2021.

(*) I.A.41. M. Basei, H. Y. Cao, and X. Guo. "Nonzero-sum stochastic games with impulse controls." *Mathematics of Operations Research*, 47 (1), 341-366, 2022.

(*) I.A. 42. F. Zhao, X. Guo. and WK Chan. "Individual green certificates on blockchain: A simulation approach" Sustainability 12 (9), 3942, 2022.

(*) I.A.43. H. Y. Cao, and X. Guo "MFGs for partially reversible investment." *Stochastic Processes and their Applications*, 150, 995-1014, 2022.

(*) I.A.44. X. Guo, R. Y. Xu, and T. Zariphopoulou. "Entropy regularizations for mean field games with learning." *Mathematics of Operations Research*, 47 (4), 3239-3260, 2022.

(*) I.A. 45. X. Guo, W. P. Tang, and R. Y. Xu. "A class of stochastic games and moving free boundary problems." *SIAM Journal on Control and Optimization*, 60(4), pp. 2355?2382, 2022.

(*) I.A.46. X. Guo, C. Lehalle, and R. Y. Xu. "Transaction cost analysis for corporate bonds." *Quantitative Finance,* 22:7, 1295-1319, 2022.

I.A.47 (**) M. Basei, X. Guo, A. R. Hu, and Y. F. Zhang. "Logarithmic regret for episodic continuous-time linear-quadratic reinforcement learning over a finite-time." Arxiv 3247127. *Journal of Machine Learning Research*, 23 (178), 1-34, 2022.

I.A.48 (**) H. T. Gu, X. Guo, X. L. Wei, R. Y. Xu. "Dynamic programming principle for mean field controls with learning." *Operations Research*, 71 (4), 1040-1054, 2023.

I.A.49 (**) X. Guo, A. R. Hu, R. Y. Xu, and J. Z. Zhang. "A general framework for learning mean-field games." *Mathematics of Operations Research*, 48 (2), 656-686, 2023.

I.A.50 (**) X. Guo, A. R. Hu, and Y. F. Zhang. "Reinforcement learning for linear-convex models with jumps via stability analysis of feedback controls." ArXiv: 2104.09311. 61(2) *SIAM Journal on Control and Optimization*, 61 (2), 755-787, 2023.

I.A.51 (**) H. Y. Cao, X. Guo, and J. S. Lee. "Approximation of N-player stochastic games with singular controls by mean field games" *Numerical Algebra, Optimization and Control*, 13(3&4), pp. 604-629, 2023.

I.A.52 (**) H. Y. Cao and X. Guo. "SDE approximations of GANs training and its long-run behavior." Arxiv 2006.02047. *Journal of Applied Probability*, 61(2), 465-489, 2023.

I.A.53 (**) X. Guo, H. Pham, and X. L. Wei. "Itô's Lemma for flows of measures on semimartingales." Arxiv 2010.05288. *Stochastic Processes and their Applications (SPA)*. 159, 350-390, 2023.

I.A.54 (**) X. Guo and O. Mounjid. "GANs training, a game and stochastic control approach." *Mathematical Finance*. 34 (2), 522-556, 2024.

I.A.55 (**) X. Guo, A.R. Hu, and J.Z. Zhang. "MF-OMO: an optimization framework for mean-field games." *SIAM Journal on Control and Optimization*, 62 (1), 243-270, 2024.

I.A.56 (**) H. Y. Cao, X. Guo, and M. Laurière, "Connecting GANs, MFGs, and OT." Arxiv 2002.04112. *SIAM on Applied Math.* 84(4), 1255?1287, 2024.

I.A.57 (**) X. Guo, J. Q. Han, M. Tajrobehkar, and W. P. Tang. "Escaping saddle points efficiently with occupation-time-adapted perturbations." *Journal of Computational Mathematics and Data Science*. vol.10, 100090, 2024.

I.A.58 (**) H. T. Gu, X. Guo, X. L. Wei, R. Y. Xu. "Multi-agent reinforcement learning, a decentralized network approach." *Mathematics of Operations Research*. 50 (1), 506-536, 2025.

I.A.59 (**) X. Guo and Y. F. Zhang. "Towards an analytical framework for dynamic potential games." *SIAM on Control and Optimization*, 63 (2), 1213-1242, 2025.

I.A.60 (**) X. Guo, B.N. Wang, R. X. Zhang, and C. Y. Zhao. "On consistency of feature selections in Lasso with signatures." Accepted to *Operations Research*. Volume 73, Issue 5, 2530-2549, 2025.

I.A.61 (**) X. Guo, X. Y. Li, C. Maheshwari, S. Sastry, and M. X. Wu. "Markov α-potential games, equilibrium approximation and regret analysis. Accepted to *IEEE TAC*. 2025.

I.A.62 (**) X. Guo, X. Y. Li, and Y. F Zhang. "An α-potential game framework for N-player dynamic games. Accepted to *SIAM Control and Optimization*. 2025.

B. Refereed Conference and Symposia Proceedings

I.B.1. Q. Yu, S. Gong, and X. Guo. "Schwarzian derivative of holomorphic mappings," *Singularities and complex geometry* (Q. Lu, S. S. T. Yau, and A. Libgober, eds.), *AMS/IP Studies in Advanced Mathematics,* 5:317–323, 1997.

I.B.2. X. Guo. "A regime switching model: Statistical estimation, empirical evidence, and change point detection," *Proc. SIAM-AMS-IMA Research Conference in Mathematical Finance*, 139–153, 2004.

I.B.3. A. Banerjee, X. Guo, and H. Wang. "Optimal Bregman prediction and Jensen's equality," *Proc. IEEE International Symposium on Information Theory*, 168, Chicago, June 27– July 2, 2004.

I.B.4. X. Guo, Y. Lu, and M. S. Squillante. "Optimal probabilistic routing in distributed parallel queues," *SIGMETRICS Performance Evaluation Review*, 32(2):53–54, 2004.

I.B.5. X. Guo and P. Tomecek. "Solving singular control from optimal switching," *Asia-Pacific Financial Market*, 15:25–45, 2008.

I.B.6. D. Lin, Z. Y. Hu, and X. Guo. "Sparsemax and relaxed Wasserstein for topic spparsity", WSDM 2018.

(*) I.B. 7. X. Guo, A. R. Hu, R. Y. Xu, and J. Z. Zhang. "Learning mean-field games." Arxiv:1901.09585, NIPS 2019.

(*) I.B. 8. X. Guo, F. M. Tang and W. P. Tang. "Consistency of the Buckley-Osthus model and the HPAM model." *International Conference of Machine Learning (ICML)*, 2020.

(*) I.B. 9. X. Guo, J. Hong, D. Lin, and N. Yang. "Relaxed Wasserstein with applications to GANs." *IEEE-ICASSP*, 2021.

(*) I.B. 10. X. Guo, A. R. Hu, and J. Z. Zhang. "Theoretical guarantees of fictitious discount algorithms for episodic reinforcement learning and global convergence of policy gradient methods." *AAAI 2022*.

I.B. 11 (**) H. T. Gu, X. Guo, T. Jacobs, P. Kaminsky, and X. Y. Li. "Transportation marketplace rate forecast using signature transform." *KDD 2024*.

II. Non-refereed Publications

A. Preprints/Works in Progress

A.II. 1 (**) X. Guo. X. Y. Li, and R. Y. Xu. "Fast policy learning for LQR with entropy regularization." Revision for *SIAM Control and Optimization*. 2024.

A.II. 2 (**) H. Y. Cao, H. T. Gu, X. Guo, and M. Rosenbaum. "Risk of transfer learning and its applications in finance." Revision for *Mathematical Finance*. 2025.

A.II. 3 (**) H. T. Gu, X. Guo and X. Y. Li. "An SDE approach to adversarial learning, with convergence and robustness analysis." Revision for Journal of Applied Probability. 2025.

A.II. 4 (**) H. T. Gu, X. Guo, T. Jacobs, P. Kaminsky, and X. Y. Li. "Transportation marketplace rate forecast using signature transform." Revision for *INFORMS Journal of Applied Analytics*, 2025.

A.II. 5 (**) X. Guo and J. C. Zhang. "Itô's formula for flow of measure in semi-martingale models with common noise." Submitted, 2024.

A.II. 6 (**) C. Cucherio, X. Guo, and F. Primevera. "Functional Itô's formula and Taylor expansions in rough path." Submitted, 2025.

A.II. 7 (**) X. Guo, A.R. Hu, J.C. Zhang, and Y. F. Zhang. "Continuous-time mean field games: a primal-dual approach." Submitted, 2025.

A.II. 8 (**) X. Guo, X. Lin, and L. Q. Zhang. "BSDE approach for α-potential games." Submitted, 2025

Books/Refereed Book Chapters

III.A.1. X. Guo and L. Shepp. "Option pricing in a world with arbitrage," Chapter in *Stochastic Optimization: Algorithms and Applications* (S. Ursayev and M. Pardalos, eds.), 87–96, Kluwer Academic Publishers, 2000.

III.A.2. X. Guo. "Some lookback option pricing problems," Chapter in *Recent Developments in Mathematical Finance* (J. Young, ed.), 39–48, World Scientific Publishers, May, 2001.

III.A.3. A. Chakrabarty and X. Guo. "Optimal stopping times with different information levels and with time uncertainty," Chapter 2 in *"Stochastic Analysis and its Application to Mathematical Finance,"* 19–38, World Scientific Publishers, 2011.

(*) III.A.4. X. Guo, T. L. Lai, H. Shek, and S. Wong. Quantitative Trading: Algorithms, Analytics, Data, Models, Optimization, Chapman and Hall, First edition 2016. Second edition 2018. Chinese and Japanese edition 2018.

(*) III.A.5. H. Y. Cao and X. Guo. "GANs, some analytical perspectives." Handbook of Machine Learning and Applications to Mathematical Finance, Cambridge Press, 2022.

III. A.6. (**) X. Guo and M. Lauríere. "Optimization Perspective and Learning Algorithms for Discrete-time Mean Field Games." Foundations and Trend in Optimization. In revision. 2025.

IV. Patents (Issued or Under Review)

IV.1. X. Guo and B. Ray. "Dynamic sampling in on-line quality controls," US pat. 6999895B2.

IV.2. X. Guo, T. Kumar, and G. Parija. "Evaluation of long-term lease contracts under demand uncertainty," YOR9-2003-0283-US1.

IV.3. X. Guo and J. Tomlin. "System and method for bandwidth management: Pricing and capacity planning," YOR8-2000-0879.

IV.4. X. Guo. "Optimal algorithms for online sealed bid auctions," YOR8-2000-0293.

IV.5. X. Guo and Q-B. Nguyen. "Multiparty negotiation optimization algorithm," YOR8-2000-0673.