VITA – JIANFENG ZHANG

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Professional Experience

Associate Professor	U. of Southern California	10/2007 –
Assistant Professor	U. of Southern California	8/2003 – 10/2007
Visiting Assistant Professor	University of Minnesota	8/2001 – 8/2003

Education

Ph.D.	in Mathematics	Purdue University	8/2001
M.S.	in Computational Finance	Purdue University	5/2001
B.S.	in Mathematics	Fudan University	7/1995

Research Interests

- Stochastic Analysis
- Backward Stochastic Differential Equations
- Stochastic Numerics
- Mathematical Finance

Publications

0. J. Zhang, *Some fine properties of backward stochastic differential equations, with applications*, Ph.D. dissertation, Purdue University, (2001).
1. J. Ma, P. Protter, and J. Zhang, *Explicit form and path regularity of martingale representations*, Levy Processes - Theory and Applications, O.E.Barndorff-Nielsen, T. Mikosch and S.I. Resnick (Eds.), Birkhauser Boston, 337-360, (2001).
2. J. Ma and J. Zhang, *Path regularity of solutions to backward stochastic differential equations*, Probability Theory and Related Fields, **122** (2002), 163-190.
3. J. Ma and J. Zhang, *Representation theorems for backward stochastic differential equations*, Annals of Applied Probability, **12** (4) (2002), 1390-1418.
4. J. Cvitanic, J. Ma, and J. Zhang, *Efficient computation of Δ-hedges for options with discontinuous payoffs*, Mathematical Finance, **13** (1) (2003), 135-151.
5. J. Zhang, *A numerical scheme for backward stochastic differential equations*, Annals of Applied Probability, **14** (1) (2004), 459-488.

6. J. Ma and J. Zhang, *Representations and regularities for solutions to backward stochastic differential equations with reflections*, Stochastic Processes and Their Applications, **115** (4) (2005), 539-569.
7. J. Zhang, *Representation of solutions to backward stochastic differential equations associated with a degenerate forward stochastic differential equation*, Annals of Applied Probability, **15** (3) (2005), 1798-1831.
8. J. Cvitanic and J. Zhang, *The steepest descent method for forward-backward stochastic differential equations*, Electronic Journal of Probability, **10** (2005), 1468-1495.
9. J. Zhang, *The wellposedness of forward-backward stochastic differential equations*, Discrete and Continuous Dynamical Systems-series B, **6** (4) (2006), 927-940.
10. J. Zhang, *Rate of convergence of finite-difference approximations for degenerate ordinary differential equations*, Mathematics of Computation, **75** (256) (2006), 1755-1778.
11. J. Cvitanic, X. Wan, and J. Zhang, *Optimal contracts in continuous-time models*, Journal of Applied Mathematics and Stochastic Analysis, Volume 2006 (2006), Article ID 95203.
12. J. Cvitanic and J. Zhang, *Optimal Compensation with Adverse Selection and Dynamic Actions*, Mathematics and Financial Economics, **1** (1) (2007), 21-55.
13. C. Bender and J. Zhang, *Time discretization and Markovian iteration for coupled FBSDEs*, Annals of Applied Probability, **18** (1) (2008), 143-177.
14. J. Cvitanic, X. Wan, and J. Zhang, *Principal agent problems with exit options*, B.E. Journal of Theoretical Economics, 8 (1) (Contributions) (2008), Article 23.
15. J. Ma, J. Zhang, and Z. Zheng, *Weak solutions for forward-backward stochastic differential equations - a martingale problem approach*, Annals of Probability, 36 (6) (2008), 2092-2125.
16. J. Cvitanic, X. Wan, and J. Zhang, *Continuous-time Principal-Agent problems with hidden action and Lump-Sum Payment*, Applied Mathematics and Optimization, 59 (1) (2009), 99-146.
17. I. Kharroubi, J. Ma, H. Pham, and J. Zhang, *Backward SDEs with constrained jumps and Quasi-Variational Inequalities*, Annals of Probability, to appear.
18. J. Zhang, *Forward Backward SDEs*, Encyclopedia of Quantitative Finance, Rama Cont (Ed), Wiley, to appear.
19. S. Hamadene and J. Zhang, *The continuous time nonzero-sum Dynkin game problem and application in game options*, SIAM Journal of Control and Optimization, to appear.
20. S. Hamadene and J. Zhang, *Switching problem and related system of reflected BSDEs*, Stochastic Processes and Their Applications, to appear.
21. J. Ma and J. Zhang, *On weak solutions of FBSDEs*, in revision.
22. J. Ma, Q. Song, J. Xu, and J. Zhang, *Impulse control and optimal portfolio selection with general transaction cost*, submitted.
23. M. Soner, N. Touzi and J. Zhang, *Martingale representation theorem for the $G-$expectation*, submitted.

24. M. Soner, N. Touzi and J. Zhang, *Aggregation approach to quasi-sure stochastic analysis*, preprint.
25. M. Soner, N. Touzi and J. Zhang, *Dual formulation of the second order target problems*, preprint.
26. M. Soner, N. Touzi and J. Zhang, *An existence and uniqueness theory for second order backward SDEs*, preprint.

Conference Talks

1. "*Representations and regularities for solutions to backward stochastic differential equations with reflections*", The 3rd Colloquium on *Backward Stochastic Differential Equations, Finance and Applications*, (Satellite Conference of ICM 2002), Shandong University, China, August, 2002.
2. "*Representation of Solutions to BSDEs Associated with a Degenerate FSDE*", AMS Meeting, Special Session on "Stochastic Analysis with Applications", Indiana University, April, 2003.
3. "*On the sharp rate of finite-difference approximations for degenerate differential equations*", Purdue Mini-conference on Financial Mathematics, Purdue University, April, 2003.
4. "L^2*-modulus and Numerical Methods for BSDEs*", Southern California Probability Symposium, University of California in Los Angeles, November, 2003.
5. "L^2*-modulus Regularity and Numerical Methods for BSDEs*", Workshop on Numerical probabilistic methods for high-dimensional problems in finance, American Institute of Mathematics, December, 2003.
6. "*The Steepest Descent Method for FBSDEs*", Workshop on Monte-Carlo Methods, Isaac Newton Institute, UK, May, 2005.
7. "*The Wellposedness of FBSDEs*", Fourth Colloquium on Backward Stochastic Differential Equations and Their Applications, Fudan University, China, May, 2005.
8. "*Weak Solutions for Forward-Backward SDEs — A Martingale Problem Approach*", Conference on Random Media and Stochastic Partial Differential Equations, University of Southern California, June, 2005.
9. "*Continuous-time Principal-Agent problems with hidden actions*", 30th Conference on Stochastic Processes and Their Applications, University of California at Santa Barbara, June, 2005.
10. "*The Steepest Descent Method for FBSDEs*", Conference on Stochastic Control and Numerics, University of Wisconsin-Milwaukee, September, 2005.
11. "*The Wellposedness of FBSDEs*", Conference on Martingales, Stochastic Analysis, and Potential Theory, University of Florida, November, 2005.
12. "*Continuous Time Principal Agent Problems with Moral Hazard and/or Adverse Selection*", Workshop on Optimization problems in financial economics, Banff International Research Station, Alberta, Canada, May, 2006.
13. "*Optimal contracting with random time of payment and outside options*", joint Stanford-

Tsukuba/WCQF workshop on quantitative finance, Stanford University, March, 2007.

14. "*Switching problems and related systems of RBSDEs*", Fifth colloquium on BSDEs and finance, University du Maine (France), June, 2008.
15. "*Impulse Control and Optimal Portfolio Selection with General Transaction Cost*", Chicago-Paris Workshop in Financial Mathematics, Chateau La Princesse (France), June, 2008.
16. "*Continuous Time Principal-Agent Problems*", 7th World Congress in Probability and Statistics, National University of Singapore (Singapore), July, 2008.
17. "*Dual Formulation of Second Order Target Problems*", International Conference on Mathematical Control Theory, Chinese Academy of Science, Beijing (China), May, 2009.
18. "*Dual Formulation of Second Order Target Problems*", Workshop on Mathematical Finance, Sabanci University, Istanbul (Turkey), May, 2009.
19. "*Monte-Carlo Methods for High Dimensional BSDEs and Associated Nonlinear Parabolic PDEs*", Workshop on Computational Finance, Kyoto University, Kyoto (Japan), August, 2009.
20. "*Law of Large Numbers for Self-exciting Correlated Defaults*", Workshop on Mathematical Finance, Kansai Seminar House, Kyoto (Japan), August, 2009.