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4. On the Probability Density Function of Baskets  
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5. Pricing under rough volatility  
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6. A Functional Limit Theorem for Limit Order Books with State Dependent Price Dynamics  
Christian Bayer, Ulrich Horst, Jinniao Qiu. *A Functional Limit Theorem for Limit Order Books with State Dependent Price Dynamics*. Annals of Applied Probability 27(5):2753–2806, <https://doi.org/10.1214/16-AAP1265>, Institute of Mathematical Statistics, 2017. Postprint version.
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## 9. On Nonasymptotic Optimal Stopping Criteria in Monte Carlo Simulations

Christian Bayer, Håkon Hoel, Erik Von Schwerin, Raul Tempone. *On Nonasymptotic Optimal Stopping Criteria in Monte Carlo Simulations*. SIAM Journal on Scientific Computing 36(2):A869—A885, <https://doi.org/10.1137/130911433>, SIAM, 2014. Published version.

## 10. SDE Based Regression for Linear Random PDEs

Felix Anker, Christian Bayer, Martin Eigel, Marcel Ladkau, Johannes Neumann, John Schoenmakers. *SDE Based Regression for Linear Random PDEs*. SIAM Journal on Scientific Computing 39(3):A1168—A1200, <https://doi.org/10.1137/16M1060637>, SIAM, 2017. Published version.

## 11. A Fully Adaptive Interpolated Stochastic Sampling Method for Linear Random PDEs

Felix Anker, Christian Bayer, Martin Eigel, Johannes Neumann, John Schoenmakers. *A Fully Adaptive Interpolated Stochastic Sampling Method for Linear Random PDEs*. International Journal for Uncertainty Quantification 7(3), <https://doi.org/10.1615/Int.J.UncertaintyQuantification.201701942>, Begel House Inc., 2017. Preprint version.

## 12. From Rough Path Estimates to Multilevel Monte Carlo

Christian Bayer, Peter Friz, Sebastian Riedel, John Schoenmakers. *From Rough Path Estimates to Multilevel Monte Carlo*. SIAM Journal on Numerical Analysis 54(3):1449–1483, <https://doi.org/10.1137/140995209>, SIAM, 2016. Published version.

## 13. Simulation of Forward-Reverse Stochastic Representations for Conditional Diffusions

Christian Bayer, John Schoenmakers. *Simulation of Forward-Reverse Stochastic Representations for Conditional Diffusions*. The Annals of Applied Probability 24(5):1994–2032, <https://doi.org/10.1214/13-AAP969>, The Institute of Mathematical Statistics, 2014. Postprint version.

## 14. An Efficient Forward-Reverse Expectation-Maximization Algorithm for Statistical Inference in Stochastic Reaction Networks

Christian Bayer, Alvaro Moraes, Raul Tempone, Pedro Vilanova. *An Efficient Forward-Reverse Expectation-Maximization Algorithm for Statistical Inference in Stochastic Reaction Networks*. Stochastic Analysis and Applications 34(2):193–231, <https://doi.org/10.1080/07362994.2015.1116396>, Taylor & Francis, 2016. Postprint version.

## 15. Forward-Reverse Expectation-Maximization Algorithm For Markov Chains: Convergence and Numerical Analysis

Christian Bayer, Hilmar Mai, John Schoenmakers. *Forward-reverse expectation-maximization algorithm for Markov chains: convergence and numerical analysis*. Advances in Applied Probability 50(2):621–644, <https://doi.org/10.1017/apr.2018.27>, Cambridge University Press, 2018. Postprint version.