

List of publications

Charles-Edouard Bréhier

January 3, 2024

References

- [1] C.-E. Bréhier,
Strong and Weak orders in Averaging for SPDEs,
Stochastic Processes and their Applications, 2012,
<https://doi.org/10.1016/j.spa.2012.04.007>.
- [2] C.-E. Bréhier,
Analysis of a HMM time-discretization scheme for a system of Stochastic PDEs,
Siam Journal on Numerical Analysis, 2013,
<https://doi.org/10.1137/110853078>.
- [3] C.-E. Bréhier,
Approximation of the invariant measure with an Euler scheme for Stochastic PDEs driven by Space-Time White Noise,
Potential Analysis, 2014,
<https://doi.org/10.1007/s11118-013-9338-9>.
- [4] C.-E. Bréhier, T. Lelièvre and M. Rousset,
Analysis of Adaptive Multilevel Splitting algorithms in an idealized case,
ESAIM: Probability and Statistics, 2015,
<https://doi.org/10.1051/ps/2014029>.
- [5] C.-E. Bréhier and E. Faou,
Analysis of the Monte-Carlo error in a hybrid semi-lagrangian scheme,
Applied Mathematics Research Express, 2015,
<https://doi.org/10.1093/amrx/abv001>.
- [6] C.-E. Bréhier, *Large deviations principle for the Adaptive Multilevel Splitting Algorithm in an idealized setting*,
Alea – Latin American Journal of Probability and Mathematical Statistics, 2015,
<http://alea.impa.br/articles/v12/12-27.pdf>.
- [7] M. Benaïm and C.-E. Bréhier,
Convergence of Adaptive Biasing Potential methods for diffusions,
Comptes Rendus de l'Académie des Sciences, 2016,
<https://doi.org/10.1016/j.crma.2016.05.011>.

- [8] C.-E. Bréhier and M. Kopec,
Approximation of the invariant law of SPDEs: error analysis using a Poisson equation for a full-discretization scheme,
IMA Journal of Numerical Analysis, 2016,
<https://doi.org/10.1093/imanum/drw030>.
- [9] C.-E. Bréhier and G. Vilmart,
High-order integrator for sampling the invariant distribution of a class of parabolic SPDEs with additive space-time noise,
Siam Journal of Scientific Computing, 2016,
<https://doi.org/10.1137/15M1021088>.
- [10] C.-E. Bréhier, M. Gazeau, L. Goudenège, T. Lelièvre and M. Rousset,
Unbiasedness of some Generalized Adaptive Multilevel Splitting algorithms,
Annals of Applied Probability, 2016,
<https://doi.org/10.1214/16-AAP1185>.
- [11] C.-E. Bréhier, M. Hairer and A. M. Stuart,
Weak error estimates for trajectories of SPDEs for Spectral Galerkin discretization,
Journal of Computational Mathematics, 2018,
<https://doi.org/10.4208/jcm.1607-m2016-0539>.
- [12] T. Lestang, F. Ragone, C.-E. Bréhier, C. Herbert and F. Bouchet,
Computing return times or return periods with rare event algorithms,
Journal of Statistical Mechanics: Theory and Experiment, 2018,
<https://doi.org/10.1088/1742-5468/aab856>.
- [13] C.-E. Bréhier, J. Cui and J. Hong,
Strong convergence rates of semi-discrete splitting approximations for stochastic Allen-Cahn equation,
IMA Journal of Numerical Analysis, 2018,
<https://doi.org/10.1093/imanum/dry052>.
- [14] C.-E. Bréhier and A. Debussche,
Kolmogorov equations and weak order analysis for SPDEs with nonlinear diffusion coefficient,
Journal de Mathématiques Pures et Appliquées, 2018,
<https://doi.org/10.1016/j.matpur.2018.08.010>.
- [15] C.-E. Bréhier and T. Lelièvre,
On a new class of score functions to estimate tail probabilities of some stochastic processes with Adaptive Multilevel Splitting,
Chaos, Focus Issue on Rare event sampling methods: development, analysis, and application, 2019,
<https://aip.scitation.org/doi/10.1063/1.5081440>.
- [16] C.-E. Bréhier and L. Goudenège,
Analysis of some splitting schemes for the stochastic Allen-Cahn equation,
Discrete and Continuous Dynamical Systems Series B, 2019,
<https://doi.org/10.3934/dcdsb.2019077>.

- [17] M. Benaïm and C.-E. Bréhier,
Convergence analysis of Adaptive Biasing Potential methods for diffusion processes,
Communications in Mathematical Sciences, 2019,
<http://dx.doi.org/10.4310/CMS.2019.v17.n1.a4>.
- [18] C.-E. Bréhier,
Influence of the regularity of the test functions for weak convergence in numerical discretization of SPDEs,
Journal of Complexity, 2019,
<https://doi.org/10.1016/j.jco.2019.101424>.
- [19] C.-E. Bréhier,
Orders of convergence in the averaging principle for SPDEs: the case of a stochastically forced slow component,
Stochastic Processes and their Applications, 2019,
<https://doi.org/10.1016/j.spa.2019.09.015>.
- [20] C.-E. Bréhier and L. Goudenège,
Weak convergence rates of splitting schemes for the stochastic Allen-Cahn equation,
BIT Numerical Mathematics, 2019,
<https://doi.org/10.1007/s10543-019-00788-x>.
- [21] C.-E. Bréhier and X. Wang,
On parareal algorithms for parabolic semilinear Stochastic PDEs,
Siam Journal on Numerical Analysis, 2020,
<https://doi.org/10.1137/19M1251011>.
- [22] G. Laibe, C.-E. Bréhier and M. Lombart,
On the settling of small grains in dusty discs: analysis and formulas,
Monthly Notices of the Royal Astronomical Society, 2020,
<https://doi.org/10.1093/mnras/staa994>.
- [23] M. Benaïm, C.-E. Bréhier and P. Monmarché,
Analysis of an Adaptive Biasing Force method based on self-interacting dynamics,
Electronic Journal of Probability, 2020,
<https://projecteuclid.org/euclid.ejp/1595923218>.
- [24] E. Ventre, T. Espinasse, C.-E. Bréhier, V. Calvez, T. Lepoutre, O. Gandrillon,
Reduction of a stochastic model of gene expression: Lagrangian dynamics gives access to basins of attraction as cell types and metastability,
Journal of Mathematical Biology, 2021,
<https://doi.org/10.1007/s00285-021-01684-1>.
- [25] A. Abdulle, C.-E. Bréhier and G. Vilmart,
Convergence analysis of explicit stabilized integrators for parabolic semilinear stochastic PDEs,
IMA Journal of Numerical Analysis, 2021,
<https://doi.org/10.1093/imanum/drab090>.

- [26] C.-E. Bréhier,
Asymptotic preserving schemes for SDEs driven by fractional Brownian motion in the averaging regime,
 Journal of Mathematical Analysis and Applications, 2022,
<https://doi.org/10.1016/j.jmaa.2021.125940>.
- [27] C.-E. Bréhier,
Approximation of the invariant distribution for a class of ergodic SPDEs using an explicit tamed exponential Euler scheme,
 ESAIM: M2AN, 2022,
<https://doi.org/10.1051/m2an/2021089>.
- [28] C.-E. Bréhier and S. Rakotonirina-Ricquebourg,
On Asymptotic Preserving schemes for a class of Stochastic Differential Equations in averaging and diffusion approximation regimes,
 Siam Multiscale Modeling and Simulation, 2022,
<https://doi.org/10.1137/20M1379836>.
- [29] C.-E. Bréhier and D. Cohen,
Strong rates of convergence of a splitting scheme for Schrödinger equations with nonlocal interaction cubic nonlinearity and white noise dispersion,
 SIAM / ASA Journal on Uncertainty Quantification, 2022,
<https://epubs.siam.org/doi/10.1137/20M1378168>.
- [30] C.-E. Bréhier,
The averaging principle for stochastic differential equations driven by a Wiener process revisited,
 Comptes Rendus de l'Académie des Sciences - Série Mathématique, 2022,
<https://doi.org/10.5802/crmath.297>.
- [31] R. Volk, M. Bourgoin, C.-E. Bréhier and F. Raynal,
Phoresis in cellular flows: from enhanced dispersion to blockage,
 Journal of Fluid Mechanics, 2022,
<https://doi.org/10.1017/jfm.2022.730>.
- [32] C.-E. Bréhier and D. Cohen,
Analysis of a splitting scheme for a class of nonlinear stochastic Schrödinger equations,
 Applied Numerical Mathematics, 2023,
<https://doi.org/10.1016/j.apnum.2023.01.002>.
- [33] C.-E. Bréhier, D. Cohen, and T. Jahnke,
Splitting integrators for stochastic Lie-Poisson systems,
 Mathematics of Computation, 2023,
<https://doi.org/10.1090/mcom/3829>.
- [34] C.-E. Bréhier, D. Cohen and G. Giordano,
Splitting schemes for FitzHugh–Nagumo stochastic partial differential equations,
 Discrete and Continuous Dynamical Systems Series B, 2023,
<https://doi.org/10.3934/dcdsb.2023094>.

- [35] C.-E. Bréhier,
Uniform strong and weak error estimates for numerical schemes applied to multiscale SDEs in a Smoluchowski-Kramers diffusion approximation regime,
 Journal of Computational Dynamics, 2023,
<https://doi.org/10.3934/jcd.2023005>.
- [36] C.-E. Bréhier,
Approximation of the invariant distribution for a class of ergodic SDEs with one-sided Lipschitz continuous drift coefficient using an explicit tamed Euler scheme,
 ESAIM: Probability and Statistics, 2023,
<https://doi.org/10.1051/ps/2023017>.
- [37] C.-E. Bréhier and S. Rakotonirina-Ricquebourg,
Asymptotic behavior of a class of multiple time scales stochastic kinetic equations,
 Stochastic Processes and their Applications, 2024,
<https://doi.org/10.1016/j.spa.2023.104265>.
- [38] C.-E. Bréhier,
Analysis of a modified regularity-preserving Euler scheme for parabolic semilinear SPDEs – total variation error bounds for the numerical approximation of the invariant distribution,
 Foundations of Computational Mathematics, To appear.

Prépublications

- [39] C.-E. Bréhier,
Analysis of a modified Euler scheme for parabolic semilinear stochastic PDEs,
 Preprint, 03.2022,
<https://arxiv.org/abs/2203.10598>.
- [40] C.-E. Bréhier,
Uniform weak error estimates for an asymptotic preserving scheme applied to a class of slow-fast parabolic semilinear SPDEs,
 Preprint, 03.2022,
<https://arxiv.org/abs/2203.10600>.
- [41] C.-E. Bréhier, J. Cui and X. Wang,
Weak error estimates of fully-discrete schemes for the stochastic Cahn-Hilliard equation,
 Preprint, 07.2022,
<http://arxiv.org/abs/2207.09266>.
- [42] C.-E. Bréhier,
Uniform error bounds for numerical schemes applied to multiscale SDEs in a Wong-Zakai diffusion approximation regime,
 Preprint, 08.2022,
<http://arxiv.org/abs/2208.00448>.

- [43] C.-E. Bréhier, D. Cohen, and J. Ulander
Analysis of a positivity-preserving splitting scheme for some nonlinear stochastic heat equations,
Preprint, 02.2023,
<http://arxiv.org/abs/2302.08858>.
- [44] Z. Lei, C.-E. Bréhier and S. Gan
Numerical approximation of the invariant distribution for a class of stochastic damped wave equations,
Preprint, 06.2023,
<http://arxiv.org/abs/2306.13998>.

Actes de congrès

- [45] C.-E. Bréhier, M. Gazeau, L. Goudenège and M. Rousset,
Analysis and simulation of rare events for SPDEs,
ESAIM: Proceedings and Surveys, 2015,
<https://doi.org/10.1051/proc/201448017>.
- [46] C.-E. Bréhier, P.E. Chaudru de Raynal, V. Lemaire, F. Panloup and C. Rey,
Recent advances in various fields of numerical probability,
ESAIM: Proceedings and Surveys, 2015,
<https://doi.org/10.1051/proc/201551015>.
- [47] C.-E. Bréhier, L. Goudenège and L. Tudela,
Central Limit Theorem for Adaptive Multilevel Splitting Estimators in an Idealized Setting,
Monte Carlo and Quasi-Monte Carlo Methods, MCQMC 2014 Proceedings, 2016,
https://doi.org/10.1007/978-3-319-33507-0_10.
- [48] C.-E. Bréhier, D. Cohen, and J. Ulander, *Positivity-preserving schemes for some nonlinear stochastic PDEs*, Sixteenth International Conference Zaragoza–Pau on Mathematics and its Applications/Monografías Matemáticas "García De Galdenao", to appear,
<http://arxiv.org/abs/2304.11064>.

PhD Thesis

Analyse numérique d'EDP Stochastiques hautement oscillantes.
Numerical Analysis of highly oscillatory Stochastic PDEs.

Link: tel-00763340. 2012.

Habilitation Thesis

Contributions en probabilités numériques : simulation de processus infini-dimensionnels, multiéchelles et métastables..

Contributions to stochastic numerics: simulation of infinite dimensional, multiscale and metastable processes.

Link: tel-03293156. 2021.

Notes

A short introduction to Stochastic PDEs. 2014.

Link: HAL.

Introduction to numerical methods for Ordinary Differential Equations. 2016.

Link: HAL.

Invariant distributions for parabolic SPDEs and their numerical approximations. 2017.

Link: HAL.