MATHEMATICS OF GENERATIVE MODELS

John Tukey Summer Graduate School, MSRI/SLMath, June 22 to July 3, 2026

Prerequisites

[1] F. Bach, *Learning theory from first principles*, Adaptive Computation and Machine Learning, MIT Press, Cambridge, MA, 2024, Alternate link. ISBN 978-0-2620-4944-3.

[2] W. E, T. Li, and E. Vanden-Eijnden, *Applied stochastic analysis*, Graduate Studies in Mathematics **199**, American Mathematical Society, Providence, RI, 2019, ISBN 978-1-4704-4933-9. MR Zbl

[3] D. J. Higham, An algorithmic introduction to numerical simulation of stochastic differential equations, *SIAM Rev.* **43** (2001), no. 3, 525–546. MR Zbl

Main References

[4] W. E, T. Li, and E. Vanden-Eijnden, *Applied stochastic analysis*, Graduate Studies in Mathematics **199**, American Mathematical Society, Providence, RI, 2019, ISBN 978-1-4704-4933-9. MR Zbl

[5] P. E. Kloeden and E. Platen, *Numerical solution of stochastic differential equations*, Applications of Mathematics (New York) **23**, Springer, Berlin, Germany, 1999, 3rd corrected printing. ISBN 3-540-54062-8. MR Zbl

[6] B. Øksendal, *Stochastic differential equations: an introduction with applications*, 6th ed., Universitext, Springer, Berlin, Germany, 2003, ISBN 3-540-04758-1. MR Zbl

Optional Material

[7] I. Goodfellow, Y. Bengio, and A. Courville, *Deep learning*, Adaptive Computation and Machine Learning, MIT Press, Cambridge, MA, 2016, ISBN 978-0-262-03561-3. MR Zbl

[8] K. P. Murphy, *Machine learning: a probabilistic perspective*, MIT Press, Cambridge, MA, 2012, ISBN 978-0-262-01802-9; 978-0-262-30616-4. Zbl

[9] K. P. Murphy, *Probabilistic machine learning: an introduction*, Adapt. Comput. Mach. Learn., MIT Press, Cambridge, MA, 2022, ISBN 978-0-262-04682-4. Zbl

[10] K. P. Murphy, *Probabilistic machine learning: advanced topics*, Adapt. Comput. Mach. Learn., MIT Press, Cambridge, MA, 2023, ISBN 978-0-262-04843-9; 978-0-262-37600-6. Zbl

[11] J. M. Tomczak, *Deep generative modeling*, 2nd ed., Springer, Cham, Switzerland, 2024, ISBN 978-3-031-64086-5.

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Bibliography by Jianfeng Lu.
https://library.slmath.org/bib/2026/bib-mgm2026.pdf