Mini-course on Numerical Integration of SDEs: Some References

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The lecture course is designed to give an accessible introduction to the numerical solution of stochastic differential equations (SDEs) and mention some simple applications.

We have kept the prerequisites to a minimum. We assume only a basic competence in algebra and calculus. Some familiarity with fundamental concepts from numerical analysis and probability is also desirable, but not absolutely necessary.

To learn more about the numerical solution of stochastic differential equations (SDEs), we recommend the following sources:

- [4] and [7] are comprehensive modern references

- [2] is a more elementary text that includes MAPLE computations

Resources that cover SDE theory (with an asterisk indicating that numerical methods are also discussed) include

- [1]: perhaps the most accessible of the rigorous texts; it starts from a very basic level and works up to a definition of SDEs

- [6]* is a fairly gentle non-rigorous text

- [3] and [5]* are at the more accessible end of the rigorous category

- the Berkeley lecture notes *An Introduction to Stochastic Differential Equations, Version 1.2** by Lawrence Evans will appeal to those with a differential equations background; these are currently available at `math.berkeley.edu/~evans/SDE.course.pdf`

References

[1] Z. BRZEŹNIAK AND T. ZASTAWNIAK, *Basic Stochastic Processes*, Springer, Berlin, 1999.

[2] S. CYGANOWSKI, P. KLOEDEN, AND J. OMBACH, *From Elementary Probability to Stochastic Differential Equations with MAPLE*, Springer, Berlin, 2002.

[3] F. C. KLEBANER, *Introduction to Stochastic Calculus with Applications*, Imperial College Press, London, 1998.

[4] P. E. Kloeden and E. Platen, *Numerical Solution of Stochastic Differential Equations*, Springer-Verlag, Berlin, 1992.

[5] X. Mao, *Stochastic Differential Equations and Applications*, Horwood, Chichester, 2nd ed., 2007.

[6] T. Mikosch, *Elementary Stochastic Calculus (with Finance in View)*, World Scientific, Singapore, 1998.

[7] G. N. Milstein and M. V. Tretyakov, *Stochastic Numerics for Mathematical Physics*, Springer-Verlag, Berlin, 2004.