

Uwe Hassler (2016): *Stochastic processes and calculus. An elementary introduction with applications*, Springer texts in business and economics

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This is another attempt at bridging the enormous gap that exists in statistics between applications of modern time series methods and models and the mathematical foundations needed to fully comprehend what is going on in this area. The book covers both discrete and continuous time stochastic processes, and it is of course in the second area where mathematical intricacies abound. The author circumvents most of these by appealing to intuition rather than giving formal proofs, or by starting with simple examples like the discrete random walk which upon ever finer subdivision of the time axis approaches a Wiener process. This appeal at the reader's informal understanding is enhanced by numerous graphs which show such approximations in action or which explain via realizations how such processes typically behave. Likewise, Ito's integral and Ito's lemma are first explained by very special simple cases which help the uninitiated into this strange world of stochastic calculus.

The first part of the book is simpler and covers discrete time series with a focus on ARMA-processes and spectral densities, plus more recent developments in ARCH models and long memory. All this is very much up to date and provides a most useful introduction to modern time series methods for anybody wishing to understand the mechanics without having to dig too deep into the mathematical foundations.

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