

Stochastic differential equations

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Hi,

I'm trying to read a book on Stochastic Calculus. However, when it presents an SDE for the first time, it doesn't really discuss much about how it is to be interpreted. For example, take the simple SDE (without a noise term):

$$d(X(t))/dt = X(t)$$

In what sense is this equality? Does it say that the probability distribution in some sense of the stochastic process $X(t)$ is identical to the probability distribution of its derivative with respect to t (should it exist for every possible trace)? Is this correct? Nowhere does the book discuss how we should interpret equations such as the above, any help is very gratefully appreciated.

One obvious solution to the above is for $X(t)$ to be distributed as the (non-random) variable e^t . But are there any solutions which are stochastic? Can anyone provide more interesting examples of SDEs (without noise terms)? Are there any which have more solutions as differential equations between stochastic processes than they do as differential equations between normal (non-stochastic) variables?

Many thanks for any enlightenment!

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