

Computer generated sample paths [msl1]

Prescription:

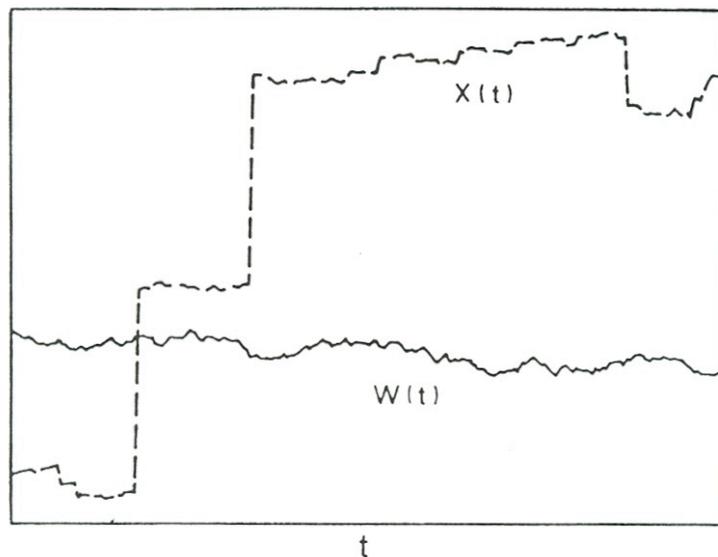
- Select Markov process: $P(x|x_0; \Delta t)$.
- Choose Δt sufficiently small (e.g. smaller than linewidth of graph).
- Produce sequence of (uniformly distributed) random numbers.
- Transform random numbers to fit $P(x|x_0; \Delta t)$ (see [nex80]).
- Use transformed random numbers as increments for sample path.

$W(t)$: Diffusion process (continuous) generated from

$$P(x|x_0; \Delta t) = \frac{1}{\sqrt{4\pi D\Delta t}} \exp\left(-\frac{(x-x_0)^2}{4D\Delta t}\right).$$

$X(t)$: Cauchy process (discontinuous) generated from

$$P(x|x_0; \Delta t) = \frac{1}{\pi} \frac{\Delta t}{(x-x_0)^2 + (\Delta t)^2}.$$



[from Gardiner 1985]