

[nex98] Specifications of Cauchy process

Examine the Cauchy process,

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

as a special solution of the differential Chapman-Kolmogorov equation by determining the three specifications (two of which are zero):

$$W(x|x_0) = \lim_{\Delta t \rightarrow 0} \frac{1}{\Delta t} P(x|x_0; \Delta t),$$

$$A(x) = \lim_{\Delta t \rightarrow 0} \frac{1}{\Delta t} \int_{|x-x_0| < \epsilon} dx (x-x_0) P(x|x_0; \Delta t), \quad B(x) = \lim_{\Delta t \rightarrow 0} \frac{1}{\Delta t} \int_{|x-x_0| < \epsilon} dx (x-x_0)^2 P(x|x_0; \Delta t).$$

Solution: