Specifications of Cauchy process

Examine the Cauchy process,

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

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

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

Solution: