

Stochastic Volterra equations - some model problems

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We discuss some model problems leading to stochastic Volterra equations of the form

$$X(t) = X_0 + \int_0^t a(t - \tau) A X(\tau) d\tau + W(t), \quad t \geq 0. \quad (1)$$

In (1), $a \in L^1_{\text{loc}}(\mathbb{R}_+; \mathbb{R})$, A is a closed linear unbounded operator and $W(t)$ is a Wiener process. To the study of the equation (1) we use the resolvent approach, which enables us to obtain results in an analogous way as in the semigroup approach usually applied to stochastic differential equations. It is worth to emphasize that in our, resolvent case, new difficulties arise because the solution operator corresponding to the Volterra equation (1) in general does not create any semigroup. The aim of the presentation is to discuss some applications of the equation (1).

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