

# Behavior of solutions of the Lotka-Volterra system under white noise

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We study a stochastic analogue of the classical Lotka-Volterra model of two competing species. The new model is obtained when the birth rate of booth species is perturbed by independent white noise. The consideration of noise changes the behaviour of the systems and leads to new situations which is no longer a deterministic case. We analyse the behavior of the mean extinction time of one of the two species as a function of the noise intensity. The generalized Lotka-Volterra model with a random interaction parameter between two competing species in the presence of a noise term is defined by the equations,

$$\begin{cases} \frac{du}{dt} = u(a_1 - b_1u - c_1v) + u\xi_u(t) \\ \frac{dv}{dt} = v(a_2 - b_2u - c_2v) + v\xi_v(t) \end{cases}$$

where  $u$  and  $v$  are the populations densities and  $a_i, b_i, c_i, i = 1, 2$  are the physical parameters which are taken positive constants. The terms  $\xi_i(t), i = u, v$  model the contribution of the random forces are the statistically independent Gaussian white noises with zero mean.

## References

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