Ninth Workshop Dynamical Systems Applied
to Biology and Natural Sciences DSABNS 2018
Turin, Italy, February 7-9, 2018

STOCHASTIC MODELLING OF VECTOR-BORNE DISEASES

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Vector-borne diseases are among the most serious health problems in the world. Recently, World Health Organization reports that every year there are more than one bilion cases and over one milion deaths from vector-borne diseases. Vector-borne diseases are illnesses caused by pathogens and parasites, which are transmitted by vectors from one infected individual to another. Vectors are usually bloodsucking insects including mosquitoes, ticks, flies, sandflies, fleas, bugs. Taking into account climate change, migration and human mobility, we observe that spreading of vector borne disease happens not only in tropical and sub-tropical regions, but also in new areas. Therefore more than half the world's population is at risk from vector borne diseases such as dengue, malaria, zika, Lyme disease, chikungunya and yellow fever.

The epidemiology of vector-borne diseases can be described by stochastic models given by a system of stochastic differential equations. We study the long time-behaviour of the solutions and prove the asymptoptic stability of the system.

References

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 ISBN: 978-989-98750-4-3