Sixth Workshop Dynamical Systems Applied
to Biology and Natural Sciences DSABNS 2015
Lisbon, Portugal, February 4-6, 2015

Epidemiological models in semiclassical approximation: an analytically solvable model as test case

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ABSTRACT

Stochastic epidemiological models which can describe actual systems can become very quickly quite complex. Approximation schemes are a useful tool to understand the qualitative behaviour of such systems. We investigate the semiclassical approximation of master equations of stochastic epidemiological systems. In a test case of the previously in detail investigated linear infection model we can solve the equations of motion of the semiclassical approximation analytically. This helps to understand generalizations to more complex and more realistic epidemiological systems as needed to describe realistic cases like multi-strain systems applicable to dengue fever for example, in which complex bifurcations up to deterministically chaotic attractors can be found in wide parameter regions.

 ISBN: 978-989-98750-1-2