Eighth Workshop Dynamical Systems Applied
to Biology and Natural Sciences DSABNS 2017
Évora, Portugal, January 31st - February 3rd, 2017

THE KIMURA EQUATION

Fabio Chalub

Centre for Mathematics and Applications and Mathematical Department,
Universidade Nova de Lisboa, Portugal

chalub@fct.unl.pt

The Kimura Equations was introduced in the 60's by the Japanese geneticist Motoo Kimura and is considered one of the most important models in population genetics. It is a degenerated partial differential equation of drift diffusion type modelling the evolution of the probability distribution among different genotypes in a population.

In this talk we will derive this equation from basic stochastic models, showing not only that it approximates in all time scales important models as the Moran and the Wright-Fisher model but in also enclosed the well know replicator equation (a first order ordinary differential equation used in evolutionary game theory). We will also show that the correct formulation of the Kimura equation include two linearly independent conservation laws to be satisfied at all times.

In the final part, we will discuss generalizations and new formulations of the same problem.

 ISBN: 978-989-98750-3-6