

# A Model for Lysogenic and Lytic Cycle For Bacteria-Bacteriophage Interaction

Saroj Kumar Sahani

Department of Mathematics, South Asian University, Rajpur Road, Maidan Garhi, New Delhi-110068, India, E-mail: sarojkumar@sau.ac.in

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## Abstract

Bacteriophage is a kind of virus that infects the bacteria by often following two life cycles. The one which is very common is the lytic path cycle and the other less common is the lysogenic cycle. In this article, a mathematical model consisting of two path cycles for bacteria-bacteriophage interaction has been proposed and studied. The underlying mathematical model is analyzed for local stability that helps to derive the local behaviour. A simple Hopf bifurcation analysis is carried out for the existence of possible small amplitude periodic solutions. Numerical investigations have been performed to check the validity of the conditions and derive the long-term dynamics of the model equations. These studies facilitate us to draw the possible consequences of bacterial infection.

## Keywords

Bacteria, Bacteriophage, Bifurcation, Lysogenic, Lytic, Stability

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