International Academy of Science,
Engineering and Technology
Connecting Researchers; Nurturing Innovations

IASET

NEIMARK-SACKER BIFURCATION IN DELAYED LOGISTIC MAP

HEMANTA K R. SARMAH[1], MRIDUL CHANDRA DAS[2] & TAPAN K R. BAISHYA[3]

[1,2]Department of Mathematics, Gauhati University, Assam, India

[3]Department of Mathematics, Debraj Roy College, Golaghat, Assam, India

ABSTRACT

The purpose of this paper is to investigate the Neimark-Sacker bifurcation in delayed logistic map. In Neimark-Sacker bifurcation, the fixed point gets converted to a unit circle. In case of our considered map, we observedmode locked state near Neimark-Sacker bifurcation point. Using the analytical technique of Normal form, we have determinedthe mode locked state in thevicinity of the NS bifurcation point. Wehave also used numerical tools like final state diagram, Lyapunov exponent, phase portrait and time series plot to establish the transition from periodic to quasiperiodic through mode locked state and finally to chaotic state.

KEYWORDS: Bifurcation, Neimark, Sacker Bifurcation, Normal Form, Quasiperiodic and Mode, Locked States, Limit Cycle