

Nasir Ganikhodjaev
Farrukh Mukhamedov
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$$x' = 2xy$$

$$y' = 2xz$$

INVESTIGATIONS ON PURE MATHEMATICS, FINANCE MATHEMATICS AND OPTICS

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$$\varphi_1(x, y, z) = z$$

$$\pi_1 = \begin{pmatrix} x & y & z \\ y & z & x \end{pmatrix}$$

$$z' = x^2 + y^2 + z^2 + 2yz$$

$$\pi_1 \nu_1 \pi_1 = \nu_{17}$$



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Investigations on Pure Mathematics, Finance Mathematics and Optics

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DYNAMICS OF GENERALIZED LOGISTIC MAPS

Intan Nurul Dayana Alladad
 Assoc. Prof. Dr. Farrukh Mukhamedov

Abstract. *This thesis is written to discuss the dynamics of generalized logistic maps. We consider such kind of logistic maps $f(x) = x(1 - x^2)$ and $f(x) = x(1 - \mu x^2)$. The function $f(x) = x(1 - x^2)$ has a unique fixed point and it has two periodic points of period two. The fixed point is a neutral fixed point and both of the periodic points are repelling. The function $f(x) = x(1 - \mu x^2)$ has three fixed points and it has six periodic points of period two. The behaviour of fixed points and periodic points are attracting, repelling and neutral in a certain range.*

1 Function $f(x) = x(1 - \mu x^2)$

Devoted to investigate about the function

$$f(x) = x(1 - \mu x^2), \mu > 0,$$

We will find the fixed points, the periodic points, eventually fixed points, and the behaviour of the fixed and periodic points.

1.1 Fixed Points

First of all, we have to find the fixed points of $f(x) = x(1 - \mu x^2)$. The fixed points are given by following equation $f(x) = x$. Hence we have

$$\begin{aligned} x(1 - \mu x^2) &= x \\ x(1 - \mu x^2 - 1) &= 0 \end{aligned}$$

Solving equation above we have,

$$x = 0 \text{ or } 1 - \mu x^2 - 1 = 0$$

therefore

$$-\mu x^2 = 0 \text{ or } x = 0$$

So we get $x = 0$ as a unique fixed point of $f(x) = x(1 - \mu x^2)$.

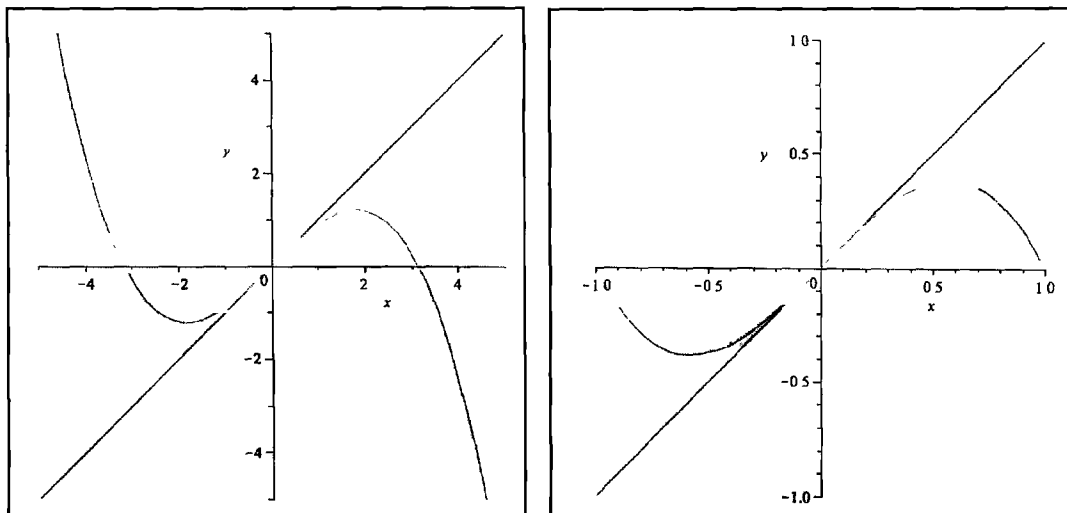


Figure 1.1: Fixed point when $\mu = 0.1$ and $\mu = 1$ show that the fixed point is 0.