**(a)**                                                    **(b)**

Fig. 3.  (a) The GM-attractor for $a = 0.008$, $b = 0.05$, $\mu = -0.9$. (b) The behavior of the FLIs indicating "slow chaos" when compared to earlier cases.
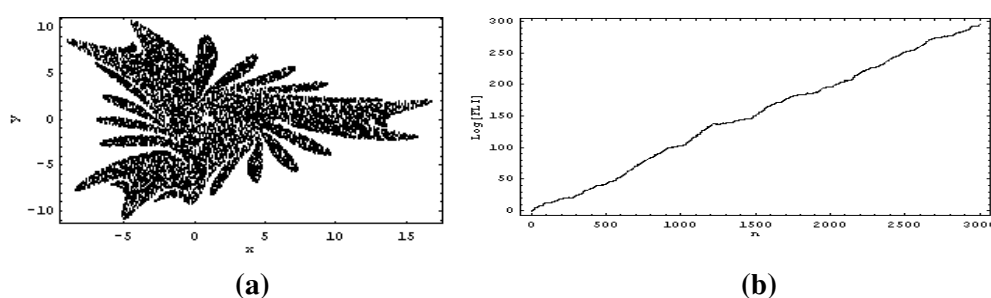


**(a)**                                                    **(b)**

Fig. 4.  (a) The GM-attractor for $a = 0.008$, $b = 0.05$, $\mu = -0.6$. (b) The plot of Log(FLI) versus iterations $n$.

The various patterns in GM-map have been simulated by Otsuba *et al*. (2000) and Ali (2005).

## 3.  Application to the Gumowski-Mira map

The GM-map admits a wide variety of attractors and we get different attractors for very small changes in the parameter $\mu$. In this letter, we intend to characterize various attractors of GM-map, based on the behavior of the FLIs, as: chaotic, periodic, bounded and quasi-chaotic.

### 3.1.  Chaotic attractors

For $a = -1.1$, $b = -0.2$, $\mu = -1.845$ and with initial conditions $x = 0.1$, $y = 0.1$, we get the attractor shown in Fig. 1(a). The behavior of the FLIs is shown in Fig. 1(b). The exponential increase in FLIs indicates that the attractor is a chaotic attractor. It may be noted that the ordinate, Log{FLI}, in Fig. 1(b) is taken with base 10.