consider the solution of (5.13) with initial data $u_1(0) = 0.1$, $u_2(0) = 0.2$. The u_1 and u_2 coordinates of the solution are depicted in Figure 2, where one can observe that the represented solution approaches to the asymptotically stable quasi-periodic solution such that the system does not possess chaos.

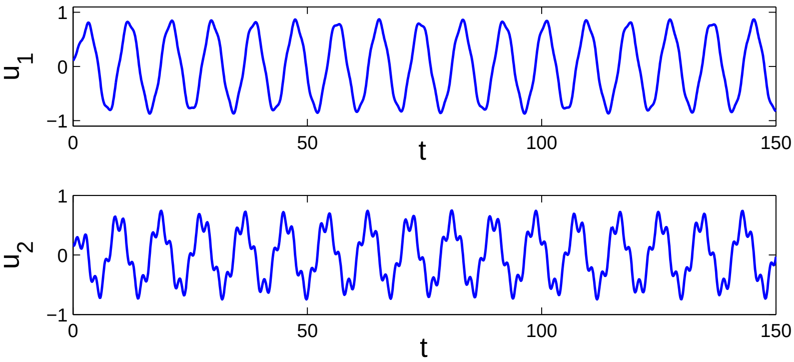

Figure 2: The quasi-periodic behavior of system (5.13).

It can be numerically verified that the bounded on $\mathbb{R}$ solutions of (5.14) lie inside the compact region $\mathscr{R} = \left\{(y_1, y_2) \in \mathbb{R}^2 : -1.1 \leq y_1 \leq 4.7,\ -5.3 \leq y_2 \leq 0.5\right\}$. Therefore, it is reasonable to consider the dynamics of (5.14) inside $\mathscr{R}$, and conditions $(C1)-(C4)$ are valid for system (5.14) with $M_G = 2.0104$, $L_1 = 0.006627$, $L_2 = 6\sqrt{2}$, and $L_3 = \sqrt{2}$. According to the theoretical results of Section 4, the set $\mathscr{B}$ consisting of the bounded on $\mathbb{R}$ solutions of (5.14) for which $(x_1(t), x_2(t))$ belongs to $\mathscr{A}$ is Li-Yorke chaotic with infinitely many quasi-periodic solutions, which are separated from the motions of the scrambled set. That is, the applied perturbation $H(x_1(t), x_2(t))$ effects (5.13) in such a way that Li-Yorke chaos takes place in the dynamics of (5.14).

In system (5.14) we use the solution of (5.11) that is depicted in Figure 1, and we represent in Figure 3 the solution of (5.14) corresponding to the initial data $y_1(t_0) = 1.32$, $y_2(t_0) = -2.25$, where $t_0 = 0.61$. Figure 3 supports the result of Theorem 4.1 such that system (5.14) possesses chaotic motions.

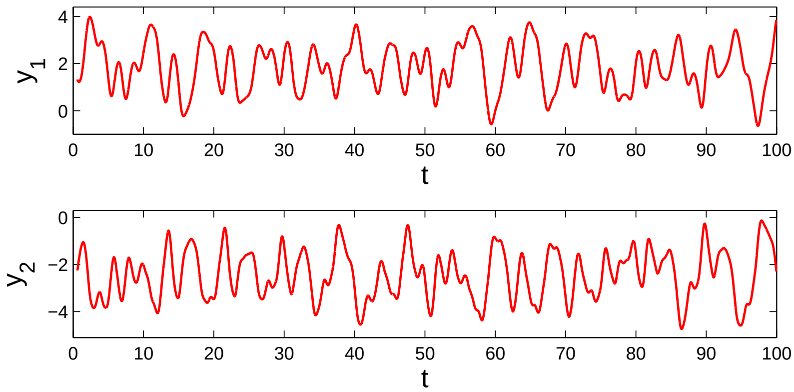

Figure 3: The graphs of the y_1 and y_2 coordinates of system (5.14).

Now, we will demonstrate that the chaos formation mechanism can be proceeded further. For that