REALIZATION OF CHAOTIC SYSTEM INTO ROBOTIC SYSTEMS

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ABSTRACT

This paper describes a realization of chaotic system representative chaos chip and aritma 2D drawing system. Chip is used for modeling and analyzes chaotic states in discrete non-linear dynamics systems. 2D drawing system presents a prothetic's knuckle.

1 INTRODUCTION

Chaos theory is a discipline, which is evolute from 60^{th} of 20^{th} century. In the end of the 20^{th} century, firm Yamakawa's Lab & FLSI develop chip, that is used for modeling and analyse chaotic states in discrete non-linear dynamic systems. The chip is called CHAOS CHIP.

The main aim of this paper isn't described a chaos theory. That's why we don't describe about several problem of this theory.

From Faculty of Mechanical Engineering we have a input to realize prothetic's knuckle. They want from us construct a 2 axes of moving the knuckle. They already have the next, third axe. We use a chaos chip for abnormal, chaotic and non-linear behaviour of this knuckle. 2 axes are created of aritma 2D drawing system.

2 REALIZATION

For right use chaos chip we need a pulse generator. We use rectangular pulses of these parameters: $U = \pm 5V$, $f = 10$ Hz. Chaos chip has a lot of different settings and he is very sensitive for them. Very small change of one parameter presents different move of knuckle. All of these settings are describes in [1].

Aritma is a plotter with two axes. Each axis is driven through DC motor with permanent magnets. Direction of move of each motor is realised by chaos chip and his outputs.

The basic circuit diagram is on figure no. 1. The real circuit is show on figure no. 2.

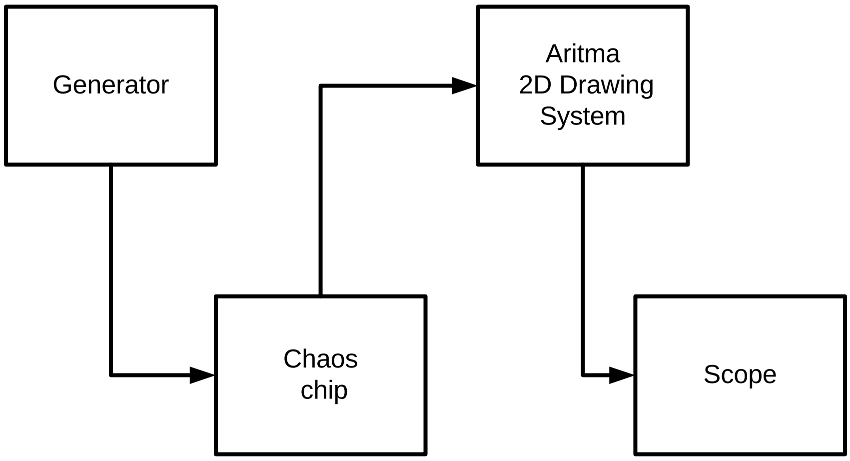

Fig. 1: *Basic circuit diagram*

Fig. 2: *Main application of chaos chip*

Acquirement of results of chaos chip is representive by scope. The scope must be used in XY mode.

3 RESULTS

On the following pictures are displayed several movements of aritma. Each of these pictures has chaotic attractor with initial conditions.

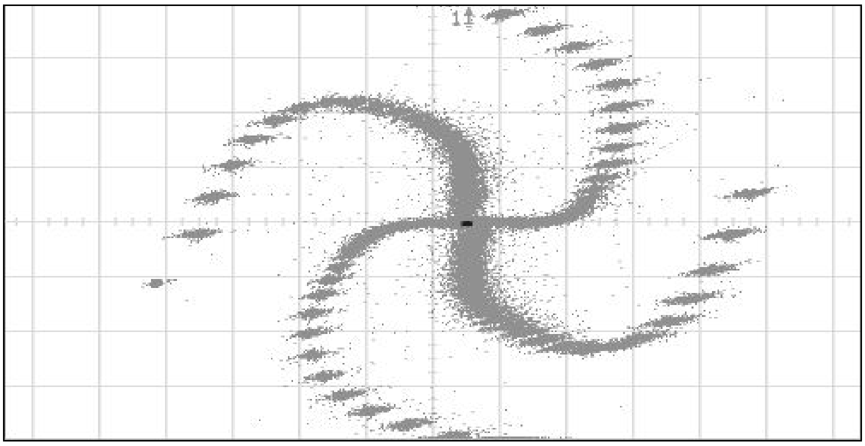

Fig. 3: *Chaotic attractor with initial conditions set no. 1*

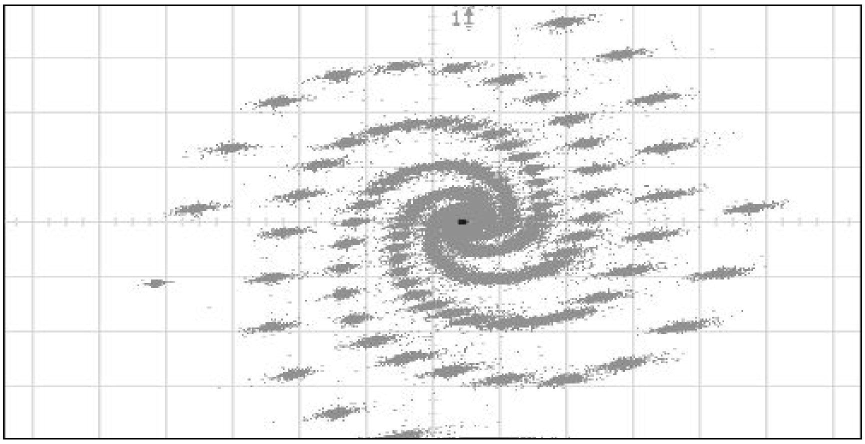

Fig. 4: *Chaotic attractor with initial conditions set no. 2*

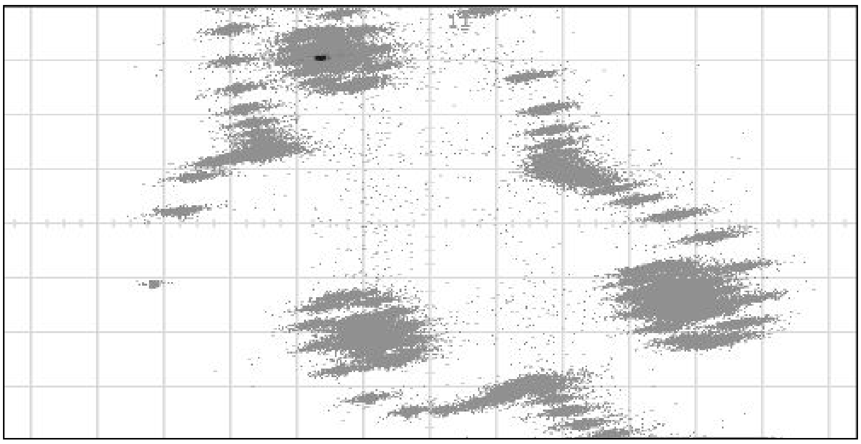

Fig. 5: *Chaotic attractor with initial conditions set no. 3*

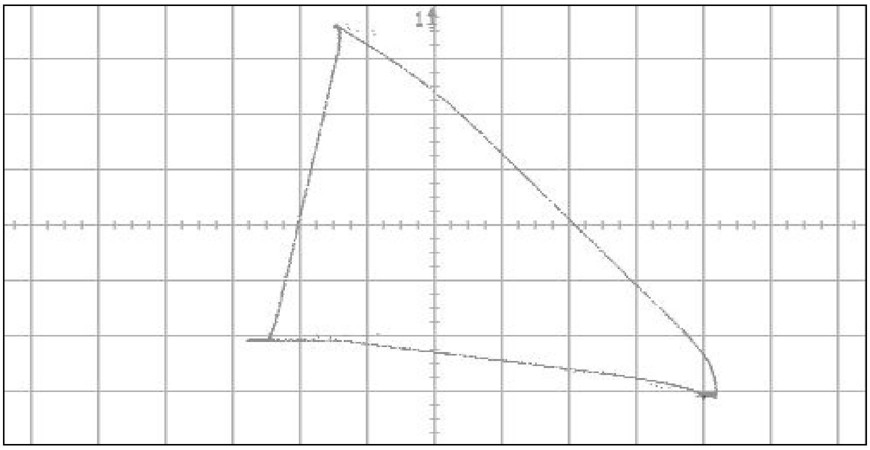

Fig. 6: *Chaotic attractor with initial conditions set no. 4*

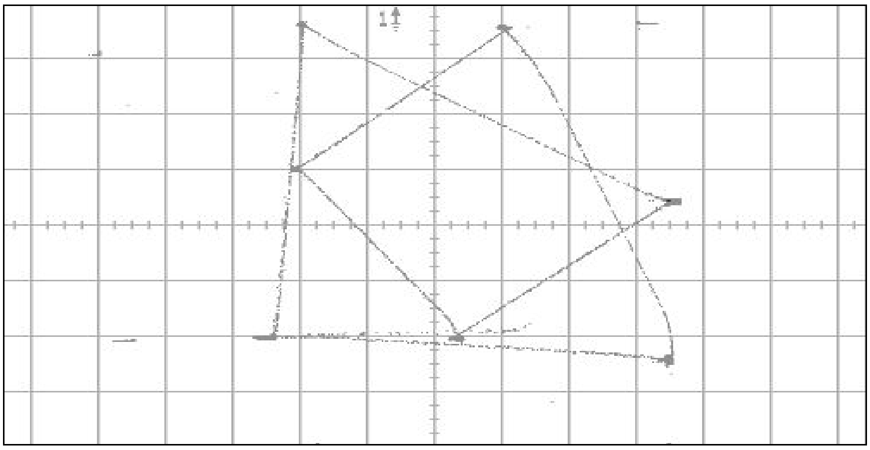

Fig. 7: *Chaotic attractor with initial conditions set no. 5*

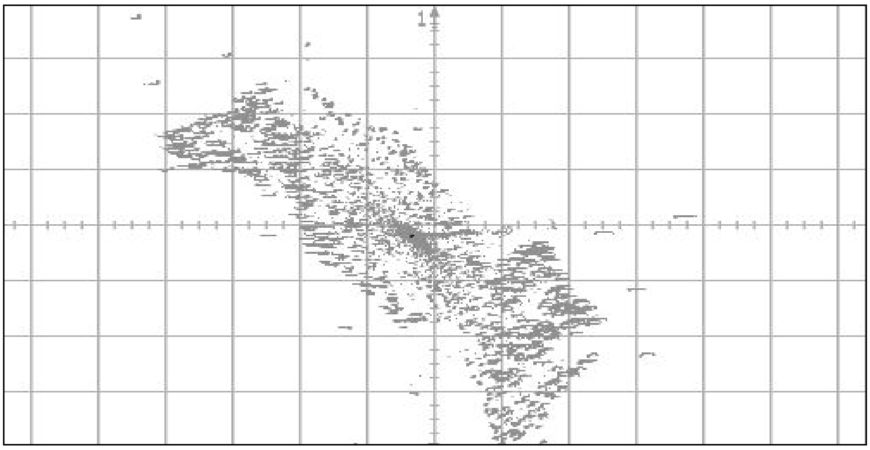

Fig. 8: *Chaotic attractor with initial conditions set no. 6*

4 CONCLUSION

The results show a chaotic behaviour of knuckle. The system can be steady or not steady. Typical of steady system is on figure 3 or 4. In this case the system steady in one point. The system can steady in several points (for example three points). It show figure 5, 6 and 7 (seven points). Typical of non-steady system is on figure 8. This figure presents real behaviour of knuckle.

ACKNOWLEDGEMENTS

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[2] Gleick, J.: Chaos: Making a New Science. Penguin (Non-Classics). Reprint edition (December 1, 1998), ISBN: 0140092501