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Study of Effect of Noise on Multi Input Single Output FLC and AIFLC

Dr. Rekha Annigeri
Assistant Professor, Department of Electronics, Govt. Degree College (Autonomous), Kalaburag-585105 Karnataka India

Abstract: ***This paper represents effect of noise on multi input and output FLC and AIFLC. Noise is a term referred as unwanted electrical signals that accompany the message signals. These unwanted signals arise from a variety of sources and can be classified as man-made or naturally. Introduction of noise/disturbance causes instability in the control system. Hence, it is very essential to study the effect of noise. Noise reduction is an important issue in any process control application. Noise contaminates the process control signals. Noise imposed on the process controller may be of entirely unknown composition, which degrades the quality of the controlling signals. The sources of noise may be external to the system or internal to the system. In usual laboratory conditions, feedback control systems do suppress noise. The present paper shows the effects of uniform white noise are studied for the speed control of BLDC motor using 3 input single output FLC and AIFLC and 2 input single output FLC and AIFLC.***

Keywords: Fuzzy logic Tool kit, Labview,

I. INTRODUCTION

Automatic controllers require a precise mathematical model for the given system to be controlled. In many complex industrial processes, the construction of mathematical model is too difficult and very complex and nonlinear. In such situations, fuzzy logic controllers (FLC) are most appropriate. In order to improve the performance of the system, one has to apply FLC technique because they give high stability, more robust control, more accuracy and higher flexibility.

A. White Noise

White noise has infinite average power and as such it is not physically realizable. White noise used in the present application generates a uniformly distributed pattern whose values are in the range (-a, a) where a = ± 1 mV, ±3mV, ± 5 mV. For uniform white noise, the Probability Density Function (PDF) of the amplitudes of the time domain samples is uniform within the specified maximum and minimum levels, implying that hall amplitude values between some limits are equally likely or probable. Thermal noise produced in active components tends to be uniform white in distribution. Figure 6.1 shows the distribution samples of uniform white noise. i.e., amplitude vs time. For the present application, the uniform white noise is generated using LabVIEW software.

II. OBJECTIVES

Design and develop the hardware for control of speed parameters using fuzzy logic controllers. Design and develop the software for control of Physical Parameters using fuzzy logic controllers. Study the designed hardware and software for control of Physical Parameters using fuzzy logic controllers.

III. EXPERIMENTAL SETUP

The VI block diagram for studying the effect of uniform white noise on three- input single -output AIFLC is shown in Figure 1and 2. The VI block diagram for studying the effect of uniform white noise on MISO FLC and two- input single- output AIFLC is similar to that of three input single output FLC.

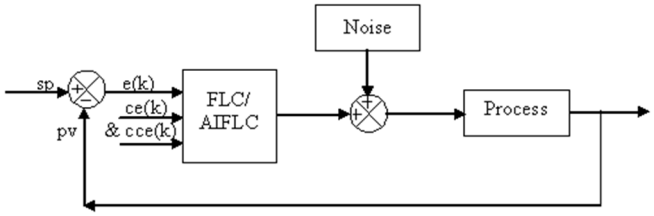


Figure 2: Block diagram for studying effect of noise on MISO FLC and AIFLC.

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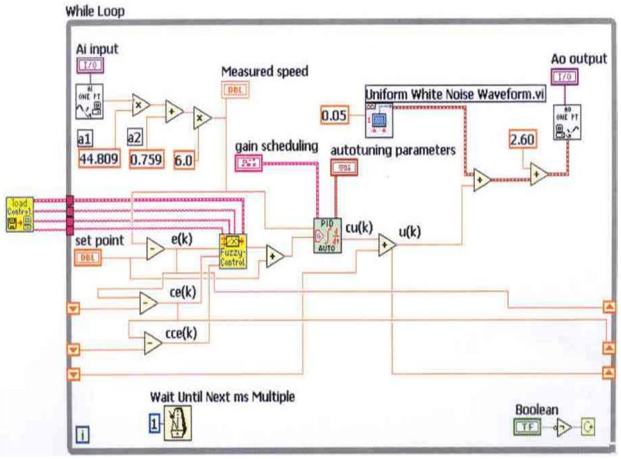


Figure 3: VI block diagram for studying suppression of uniform noise using three- input single- output AIFLC

IV. EXPERIMENTAL RESULTS AND DISCUSSIONS

Figure shows the experimental time response for suppression of uniform white noise on three-input single-output AIFLC for the speed control of BLDC motor at the desired speed of 1500 rpm. Table 4 gives the detailed experimental observed values for the settling time, the uniform white noise for the present application

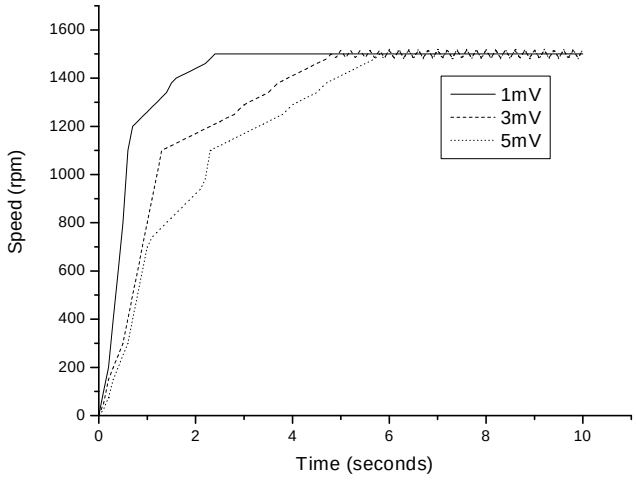


Table 4: The experimental time response for suppression of uniform white noise on three-input single-out put AIFLC.

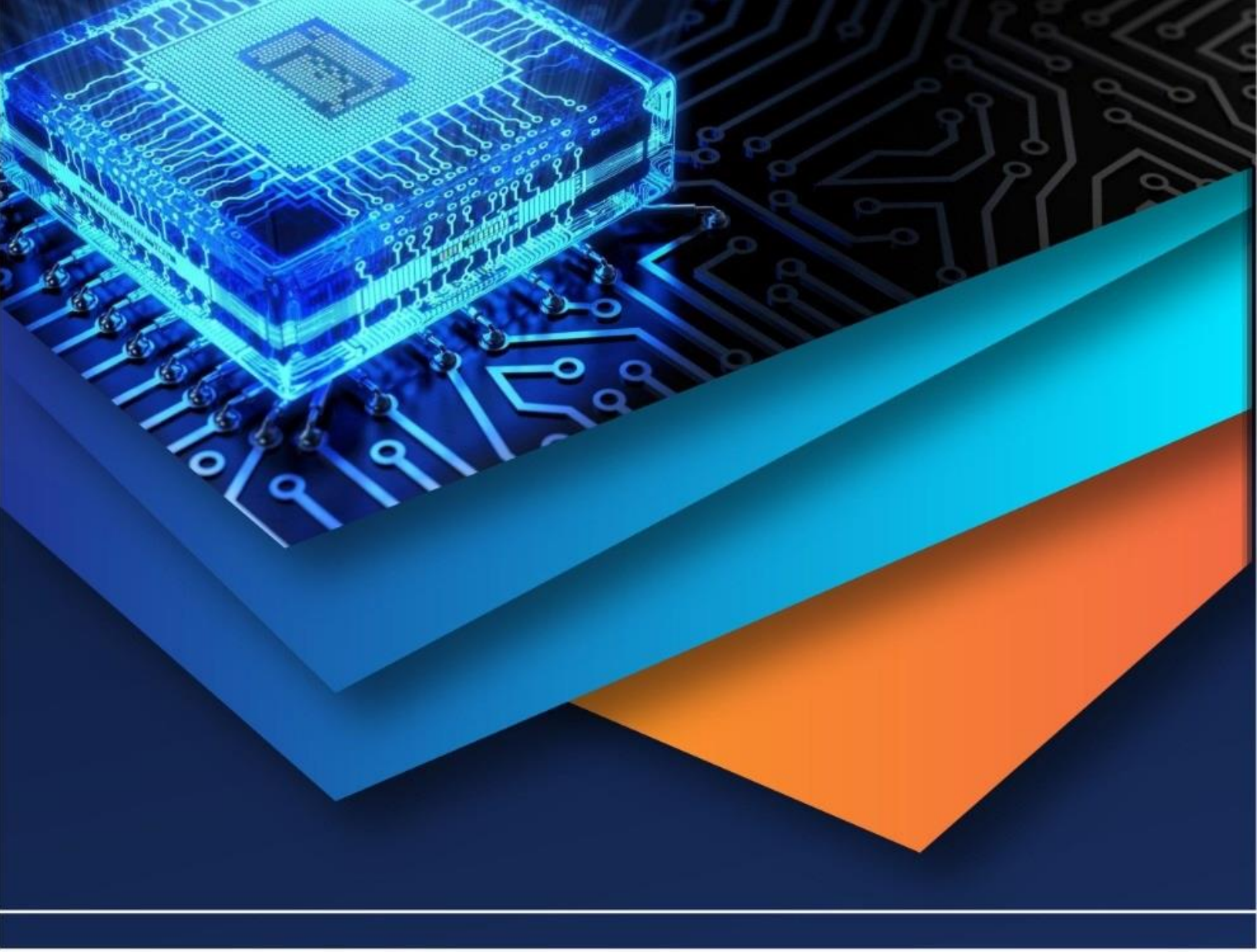
V. CONCLUSION

This work laid the new era of in modern control system. To the best of our knowledge, there are very few reports on the effects of the external uniform white noise on the performance of various controllers (two-input single-output FLC, AIFLC, three-input single-output FLC and AIFLC) for BLDC speed control. Hence, we are unable to compare our results with the results of other researchers.

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