Electrical Energy Efficiency in Lighting of Learning Room with Fuzzy Logic Method

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The purpose of this research is to keep learning room getting adequate lighting, uneven, do not damage the health of the eyes and save energy. The lighting in the workplace especially specialized on the lecture hall is an important aspect to support teaching and learning activities [2]. Lighting that does not meet minimum standards can cause eye health [1]. Fuzzy logic control in this system can control and maintain stability based on a given set point despite a change in the intensity of room lighting [3]. Optimization study room lighting with fuzzy logic control looks like in Figure 1.

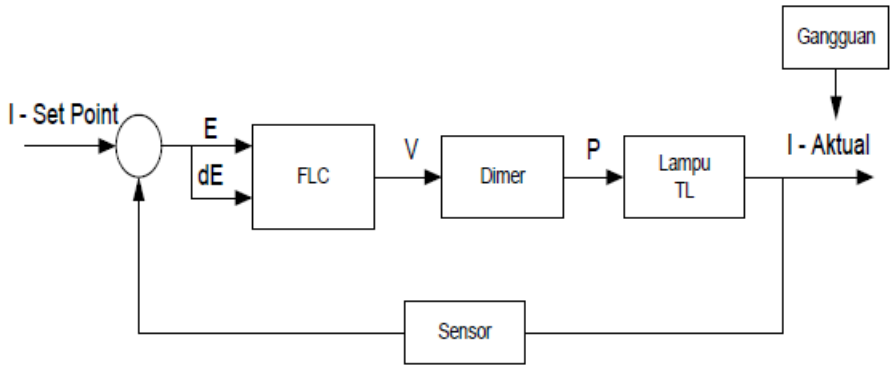

Figure 1: Diagram of fuzzy logic control room lighting

The design of the controller with Fuzzy Logic in this study using Stsukamoto. Fuzzy input membership function using triangular membership function as shown in Figure 2 and Figure 3. The output fuzzy fuzzy input used in the form Error (E) and the change in error (dE), while the fuzzy controller output is the voltage (V).

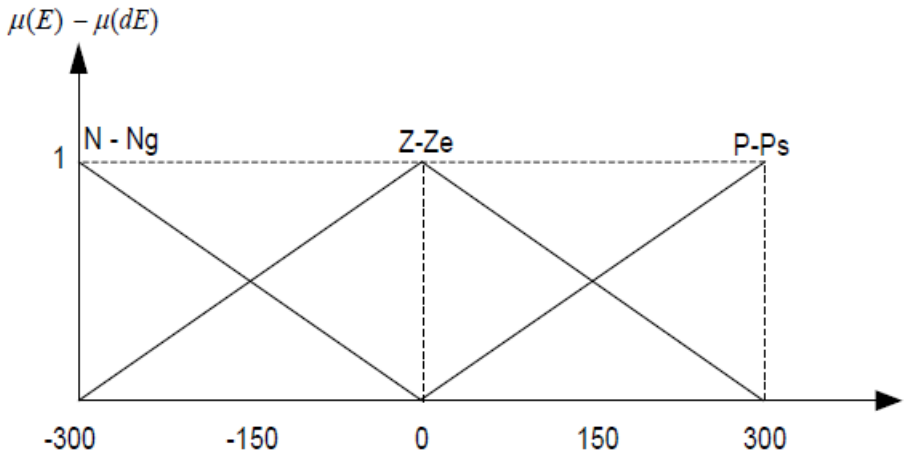

Figure 2: Membership Function Input Error (E) and Change Error (dE)

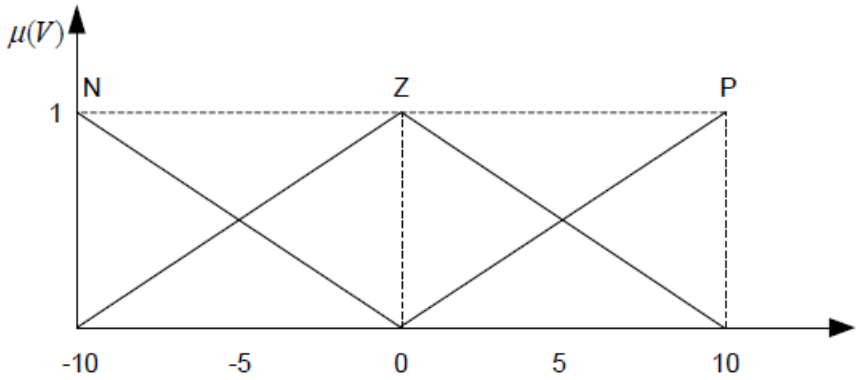

Figure 3: Membership Function control output signal (V)

The virtue of this research is to make learning more convenient indoor lighting during the day so that the learning process goes well and in terms of cost can save electricity consumption. The main function to save power consumption in the study room at noon. based on.

The system can correct the error in the amount of 150 lux, by controlling the control voltage of 5 volts so that the intensity of the ambient light remains in the position set point. The cost of electrical energy consumption after optimization of 52.38%, resulting in cost savings of electrical energy consumption amounted to 47.62%

REFERENCES

[1] Amin, Nurhani. 2011. Optimasi Sistem Pencahayaan dengan Memanfaatkan Cahaya Alami (Studi Kasus Lab. Elektronika dan Mikroprosessor Untad). Jurusan Teknik Elektro Universitas Tadulako Palu. Palu: *Jurnal Ilmiah Foristek Vol.1, no. 1, Maret 2011*

[2] Irianto, Chairul Gagarin. 2006. Studi Optimasi Sistem Pencahayaan Ruang Kuliah dengan Memanfaatkan Cahaya Alam. Jurusan Teknik Elektro-FTI, Universitas Trisakti. Jakarta: Jetri, Volume 5, nomor 2, Februari 2006, Halaman 1-20.

[3] T. Sutojo, Edy Mulyanto, Vincent Suhartono, 2011. Kecerdasan Buatan. Penerbit Andi Yogyakarta 2011.