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Improve Performance of FAUB Error for Three Phase Power Distribution System

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Abstract:-Distribution system issues, similar to loss minimization, planning and energy restoration, in some cases include the phase adjustment. Flawed dispersion will lead few regions full and couple of zones with less stacked. In this way to keep away from these conditions, prevailing of force and subsequently controlling of load is required in those territories. It brings about the load equalization. Load equalization or balancing out is that the system to prevent the system from over burdening situation. Amid this paper we have a tendency to plan and execution of power load adjusting by utilizing mathematical logic (fuzzy logic) tool compartment of a MATLAB. As indicated by past work consequences of Final Absolute Average Unbalance i.e. FAUB/Phase= 3.33kw. We will modify variation of input reliable with fuzzy principle. On the off chance that we plan the standards steady with given principles then the FAUB will be diminishing from 3.33kW.

Keyword: *- FAUB , Fuzzy .*

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1. INTRODUCTION

Phases are the different angles at which the three alternating currents being transmitted by the power line differ from each other. The transmission occurs through power lines and other intermediary devices like transformers mounted on poles and substations and at the consumption area, it requires appropriate wiring and meter systems to support it.

This is the transformer that converts power being transmitted over the power lines which is usually of high voltage to the power levels that is safely used by the consumer to power appliances. It`s usually the last point at which power is modified before providing a supply cable to the consumer which could be home or industrial use. The process of converting high to lower voltage is called step down. The transformer steps down incoming high voltage typically 10KV to 240V single or three phase output. Voltage values however vary between countries with the main types being that of north America at 120V and Europe at 240V being supplied to the consumer.(Ron Kurt us, 2015) The cost of a3 phase power is relatively expensive as compared to single phase in terms of production, extension and the type of meters involved. Also you would find that some places have only single phase and a customer requires a 3 phase line for use. It therefore calls for the conversion of the available single phase to a 3 phase supply. This is made possible by use of phase changers that modifies the single phase to give an output of 3 phase power that is then used by the consumers. However, the single phase input should have sufficient power for this conversion to happen efficiently

2. PROBLEM STATEMENT

The distribution system problems, such as planning, loss minimization, and energy restoration, usually involve the phase balancing. The faulty distribution can lead some areas overloaded and some areas with less loaded. So to avoid these conditions, controlling of power and hence controlling of load is required in those areas. It leads to the load balancing technique. Load balancing is the process to prevent the system from overloading situation.

Fuzzy logic provides easy way using graphical user interface to implement fuzzy system. Final Absolute Average Unbalance (FAUB) / Phase = 3.33 kW. According to the paper, the input load ranges are as follows:

S. No	Input (LOAD)Description	Fuzzy Nomenclature	KW Range
1	Very Less Load	VLL	0 to 50
2	Less Load	LL	35 to 85
3	Minimum Less load	MLL	65 to 115
4	Perfectly Load	PL	100 to 150
5	Single Over Load	SOL	125 to 175
6	Medium Over Load	MOL	165 to 215
7	Over load	OL	200 to 250
8	Heavily Over Load	HOL	235 to 300

The calculation is working on the basis of the fuzzy logic rule of the base paper. Figure 1 is showing the fuzzy logic rule for the base paper. The range of the input is [0 to 300] KW. The values are designed according to table number 1.

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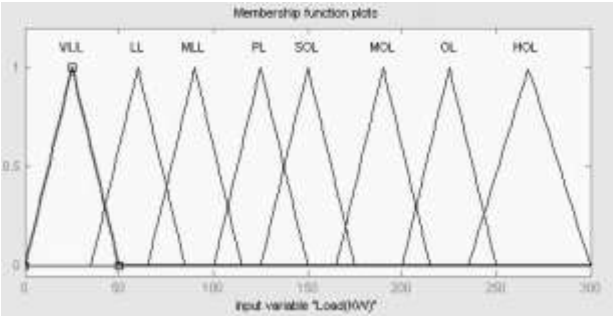

Figure 1

According to apply fuzzy logic rules the output load of the project is coming in range of [-150 to 150].The values of the VLL, LL, MLL, PL, SOL, MOL, OL, HOL is set according to table number 2.

S.No	Input (Load)Description	Fuzzy Nomenclature	KW Range
1	High Subtraction	VLL	-150 to -85
2	Subtraction	LL	-100 to -50
3	Medium Subtraction	MLL	-65 to -15
4	Slight Subtraction	PL	-50 to 25
5	Perfect addition	SOL	0 to 50
6	Medium Addition	MOL	35 to 85
7	Large Addition	OL	65 to 115
8	Very Large Addition	HOL	100 to 150

Table 2 out put

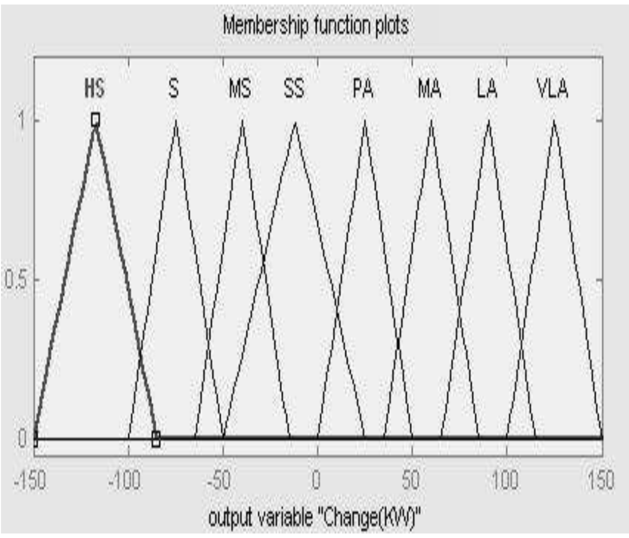

Figure 2 Output

According to Figure 2 output fuzzy rules are designed from range [-150 to 150]. According to given rules the value of the output will come according to the surface view of the project. The graph is showing the relationship in between input and output. The input is load I KW and output is change in KW. It is the surface view of the mat lab input and output functions. Figure 3.4 is showing the Fuzzy logic rules values. The input according to the output values.

3. PROPOSED METHODOLOGY

We change the fuzzy rules for the input session. But the rules of the output are the same. The Load Change Range has been kept same as that to the paper, as we can only improve the input but not the change. Thus the Load Change Range is as follows:

S.No	Fuzzy Nomenclature	Value in KW
1	VLL	65
2	LL	100
3	MLL	125
4	PL	165
5	SOL	200
6	MOL	235
7	OL	275
8	HOL	235-300

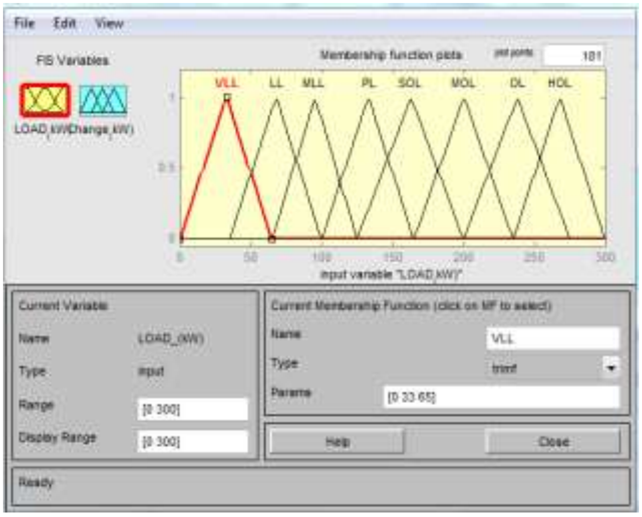

Figure 3:- Fuzzy rule for proposed design input range

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The problem in the original selection of Input Load was that there used to be a portion when the entire Load Change used to depend only on 1 Input Load. This caused unbalance in Load Change and thus the FAUB was of higher values. In the change that we have brought, at every Load Change there is exactly 2 Input Loads that reduce the unbalance.

Thus FAUB reduces and hence reduction in FAUB indicated reduction in unbalance load means improvement in phase balancing.

Using our method we have following changes.Load distribution is efficient, Load change vs Input load graph becomes smoother.

P_in = [245 120 82] kW

P_fuzzy = [-93 34 65] kW

Sum(Delta(P_fuzzy)) = -93+34+75 = 16 kW != 0

AE = round(Delta(P_fuzzy)/3) = 5

Delta(P_error) = [AE AE Sum(Delta(P_fuzzy))-2AE] = [5 5 6]

Delta(P) = P_fuzzy – Delta(P_error) = [-98 29 59] kW

P_final = P_in + Delta(P) = [147 149 147] kW

4. RESULTS

Final Initial Absolute Average Unbalance (IAUB) / Phase is 108.67 kW and Final Absolute Average Unbalance (FAUB) / Phase is 3.33kW.Thus, the reduction in unbalance indicates improvement of the phase balancing.

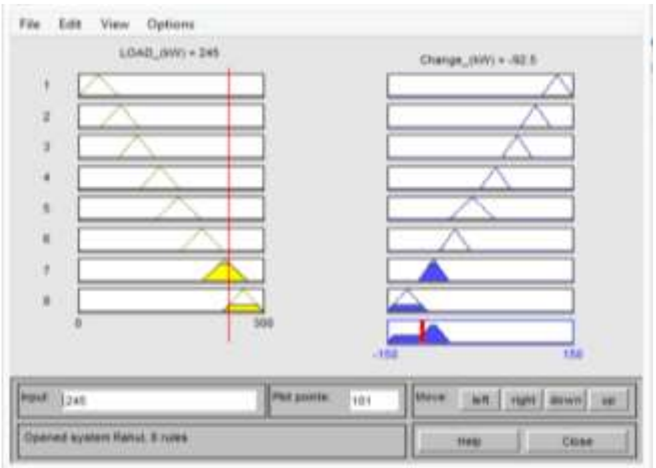

Figure 3 :- Fuzzy logic rule for output at input 245

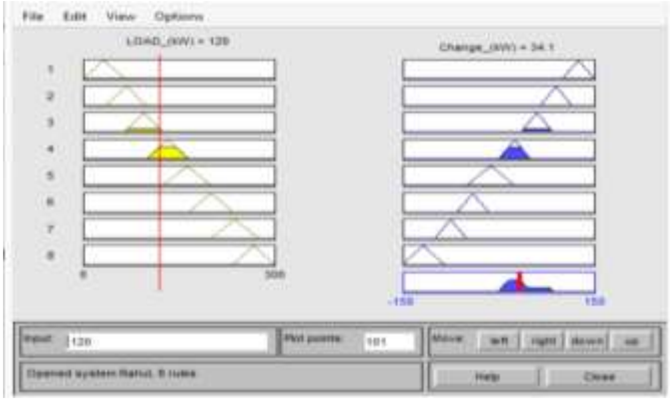

Figure 4:- Fuzzy rule output at 120

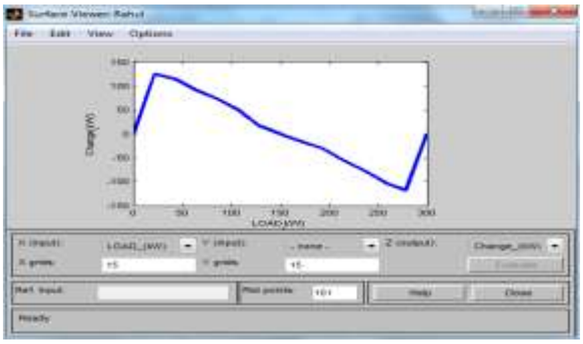

Figure 5:- Surface view

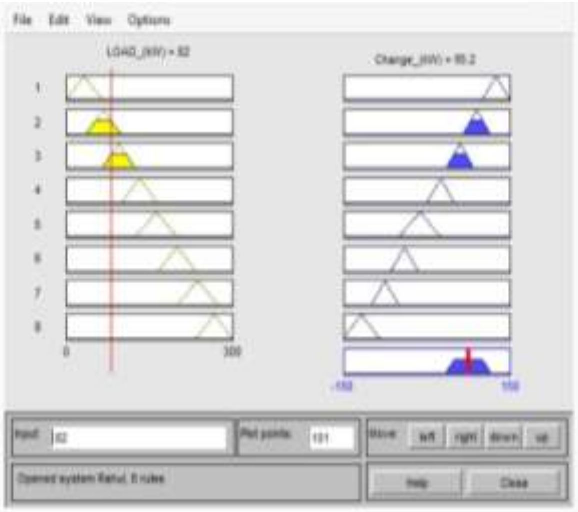

Figure 5:- Fuzzy rule output at input 82

5. CONCLUSION

Distribution system issues, similar to loss minimization, planning and energy restoration, at times include the phase adjustment. The flawed dispersion will lead few regions full and a couple of zones with less stacked. As indicated by past work consequences of final absolute average unbalance i.e. FAUB/Phase= 3.33kw. We have the capacity to change the data variety in keeping with fuzzy principle. On the off chance that we plan the standards steady with given

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principles then FAUB will be diminishing from 3.33kW. In venture with anticipated model final absolute average unbalance i.e. FAUB/Phase= 1.33kw. We are able to reduce error by value 2.0kW.

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