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# Hybrid optimization of neuro fuzzy inference system for conductivity of materials

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**Abstract**
In this proposed method, the hybrid neuro fuzzy system NFISis used to detect the conductivity of concrete materials. The conductivity of building materials will help to increase the earth leakage system. The suggested method is built by Simulink matlab. The performance of this method show that the system more effectiveness.
***Key words: NFIS, conductivity, multimeters.***

## Introduction

Recently, the properties of materials are very important to optimizing in order to create good performance of system. The meaning of conduction is the capability to communicate temperature, and sound or electrical energy such as conduction is heat moving from hot system [1]. Other proposed new approach for artificial intelligent for concrete or material [2] [3]. The acritical intelligent for ANFIS was suggested to optimize and prediction of materials [4], [5], [6].

## Proposed method via NFIS

In this method, the NFIS is combined the advantages of NN and FIS to enhance and optimize the system and to predict the properties of materials such as conductivity and resisitivity. The training system is achiedved by NN and the rules with conditions were calculated by FIS. Figure 1, 2,and 3 show the training with with regression and layers of NN respectively.

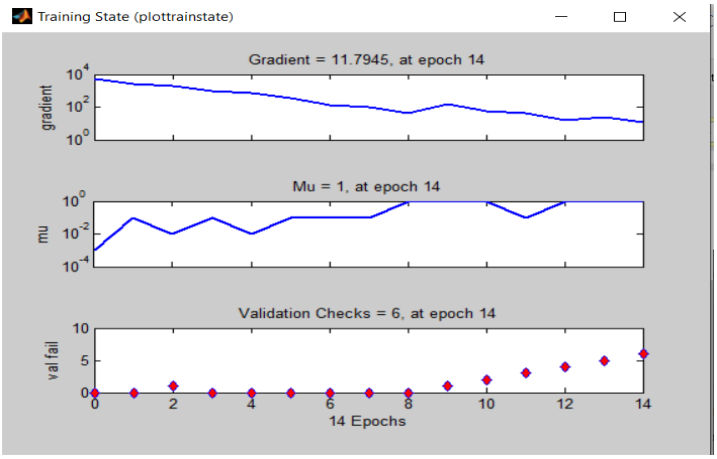


Figure1: training system

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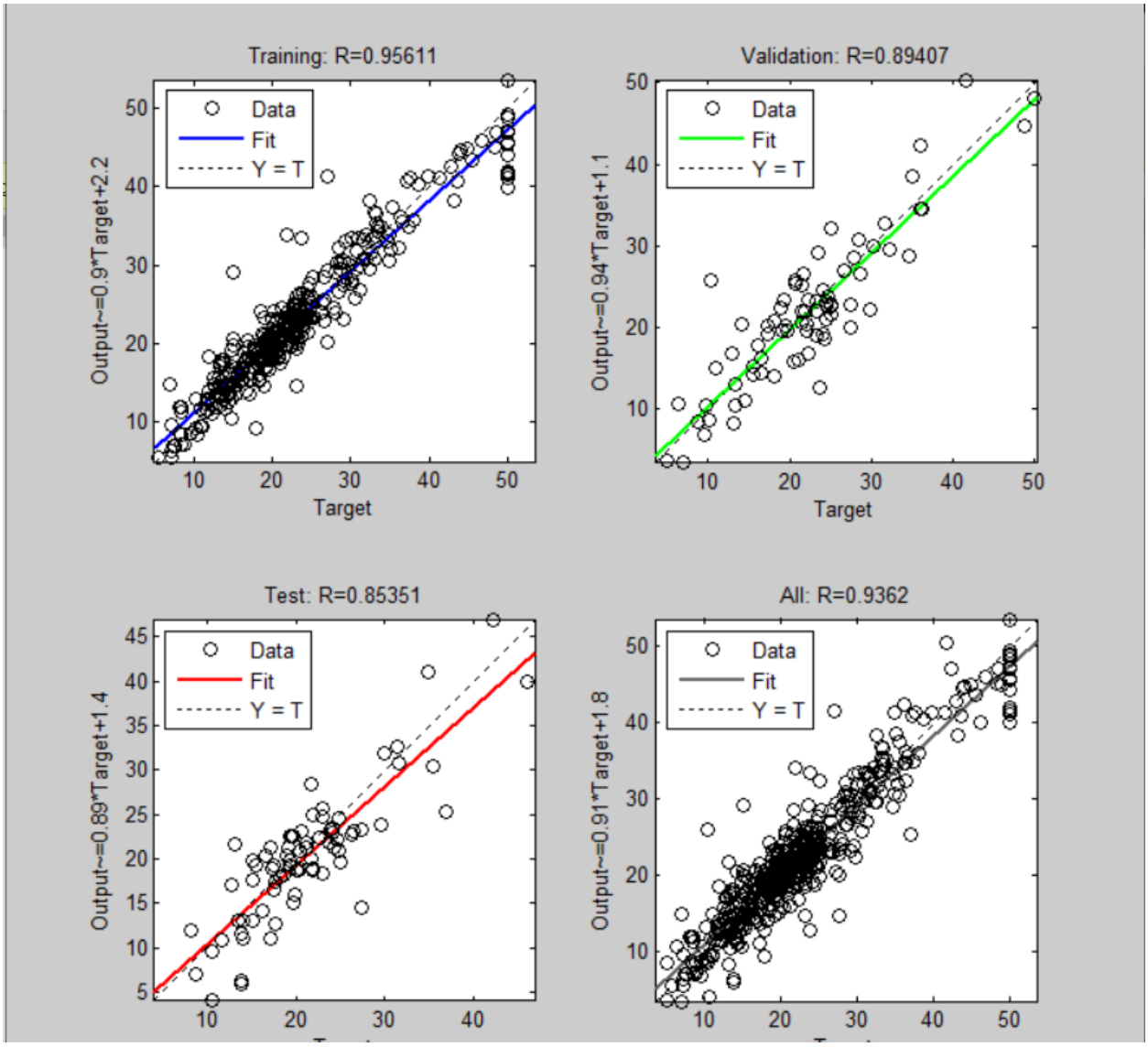


Figure 2: regression system

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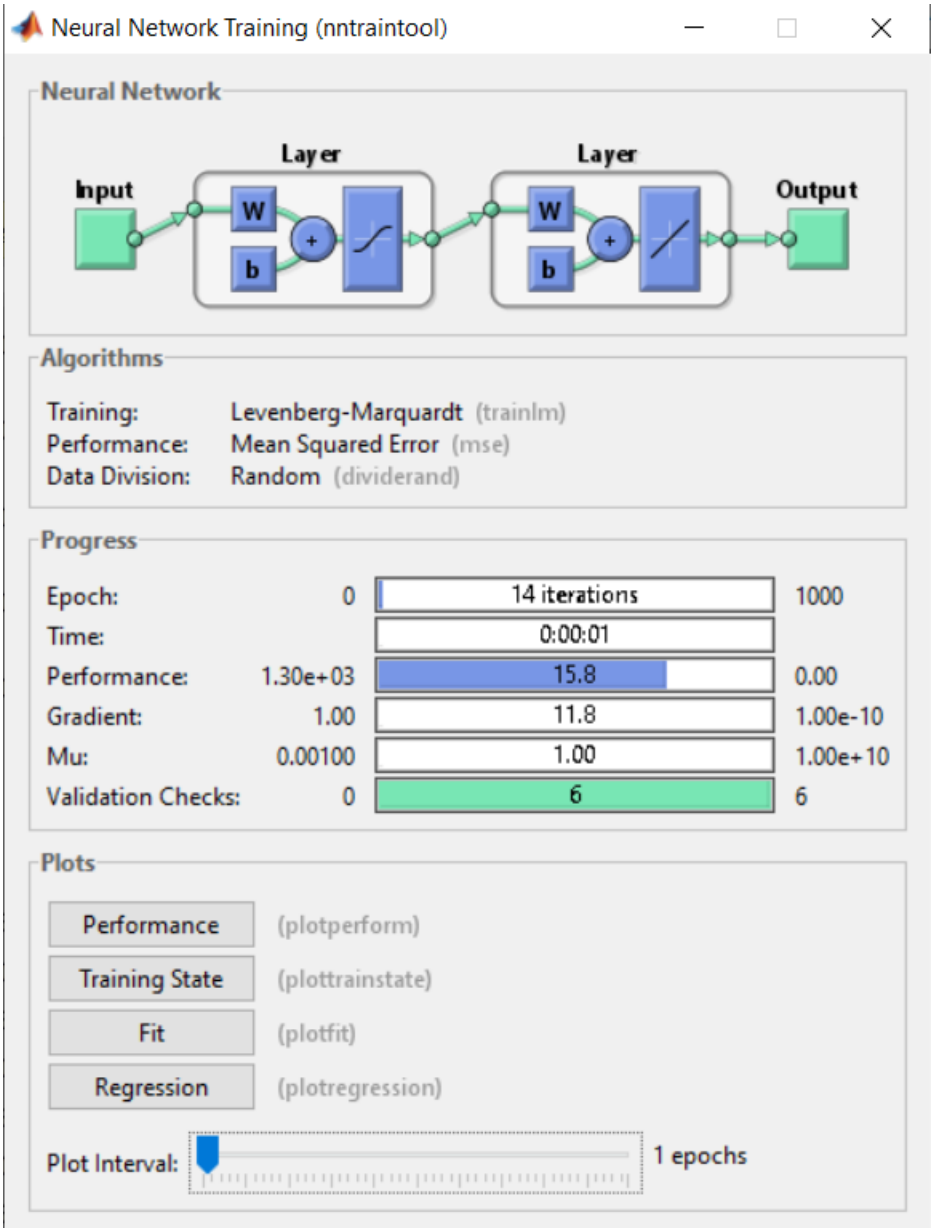


Figure 3: layers of NN

Figure 4 show the data that convert to FIS to applied the rules with conditions and figure 5 the membership function of FIS. The performance of whole system is shown in figure 6

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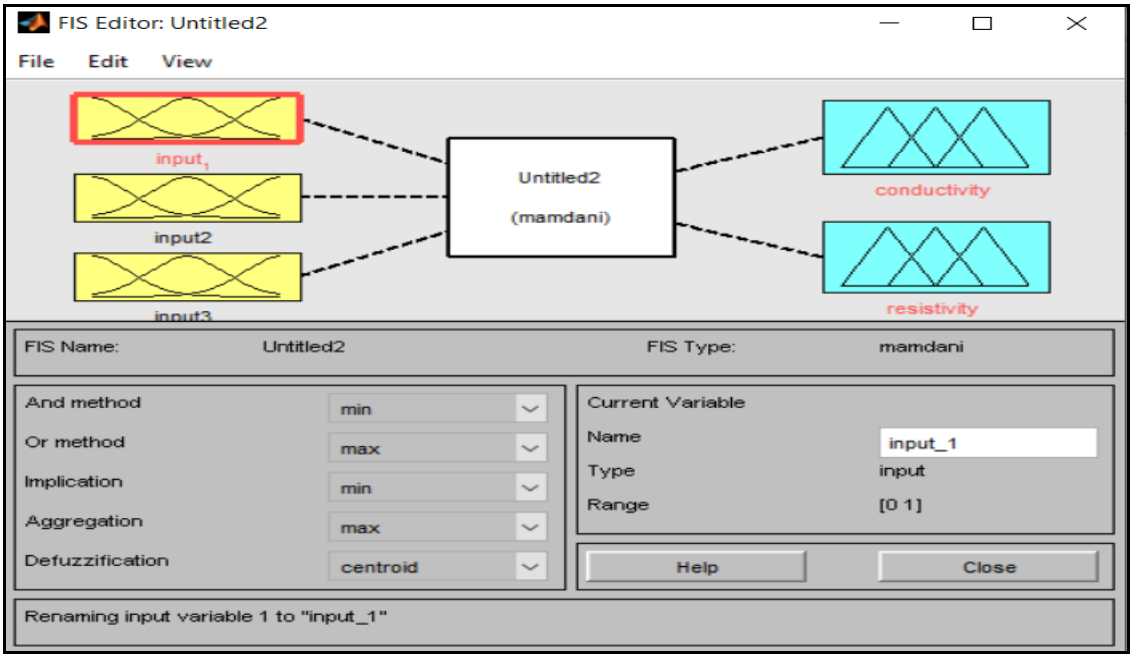


Figure 4: diagram of FIS

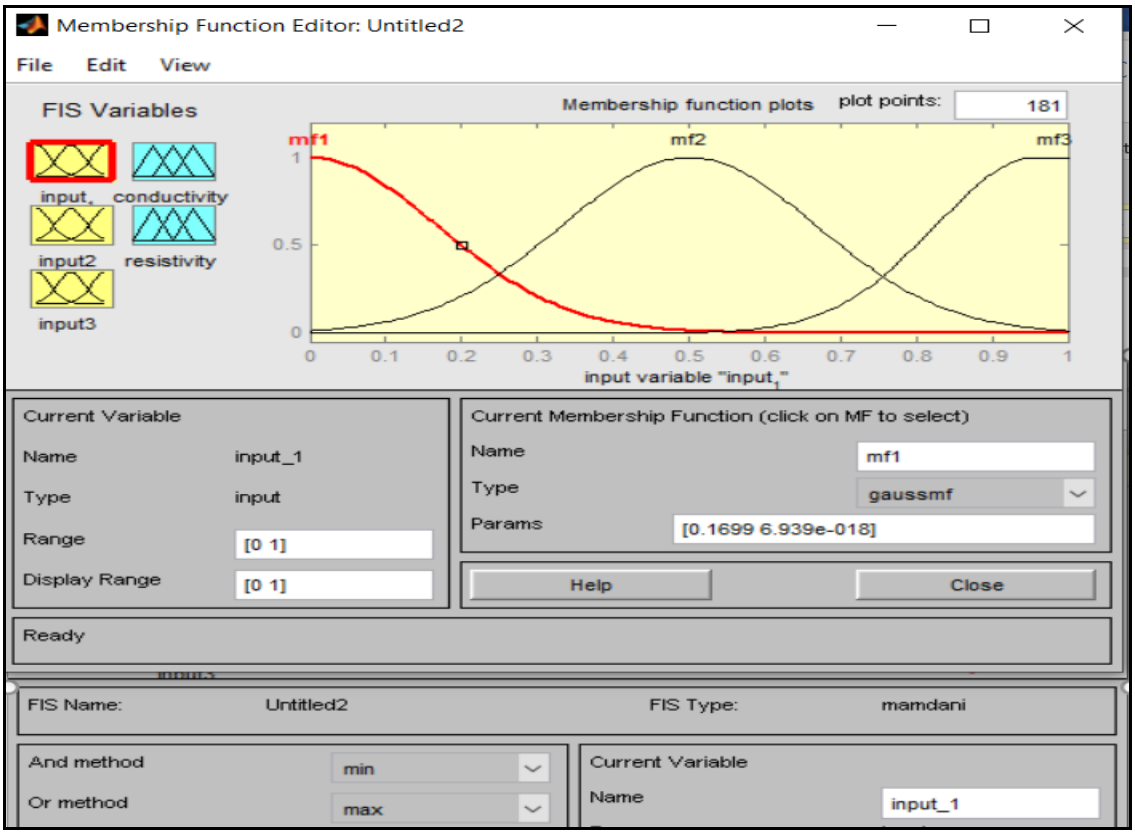


Figure 5: member ship function

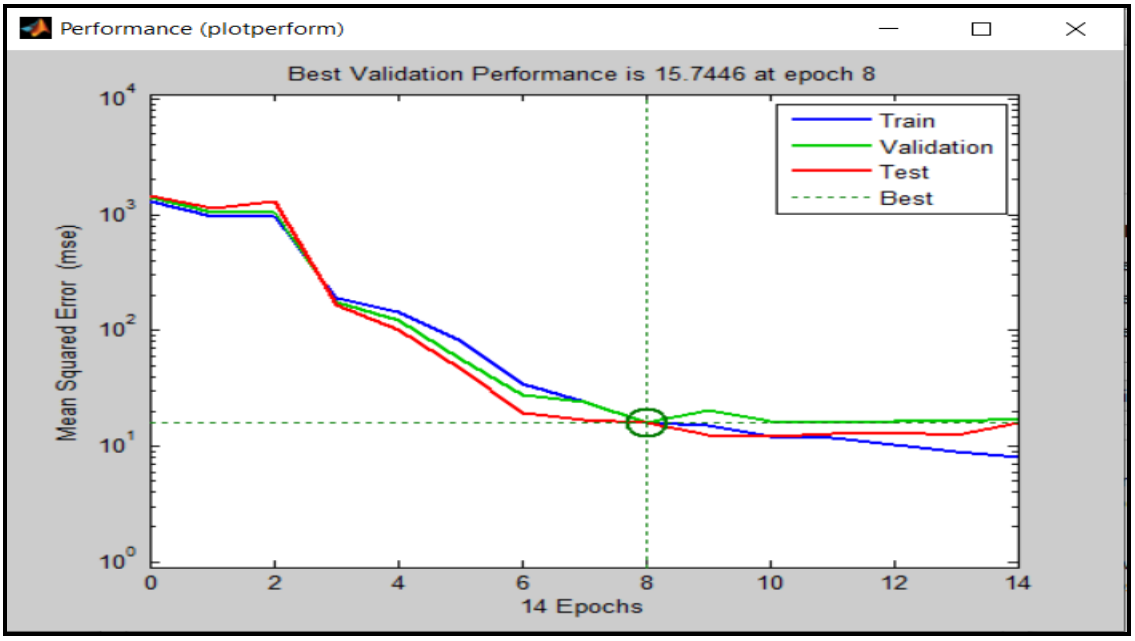


Figure 6: performance of system

**Conclusion**

In this paper, the artificial intelligent is used to predict and optimize the properties of materials based on NN and FIS. The conductivity of materials depends on semiconductors and isolated components. Therefore, NN is used to training, testing and validation while the FIS is applied to design the conditions of rules. The performance of system show the method is more effectiveness.

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