

**ANALYSIS ON FRINGING ELECTRIC FIELD SENSOR
SENSITIVITY BASED ON ITS GEOMETRY SHAPE AND
SIZING**

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SHAH ALAM, MALAYSIA



KHAIRUL RAZMAN BIN MOHD RAZALI
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM,
MALAYSIA
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ABSTRACT

The purpose of this project is to analyze the ‘Fringe Electric Field (FEF) Sensor’ sensitivity by varying its geometry shape and electrode size. Fringing electric field (FEF) sensors are used to determine the properties that cannot be measured directly for example electrostatic, temperature, hardness and many others. In this project, the FEF sensor is used to determine the moisture level in soil by measuring its capacitance values. It starts with simulation using Finite Element Method Magnetic (FEMM) to simulate the FEF sensor. The process then continues with fabricating the FEF sensor using Printed Circuit Board (PCB) technology. The FEF sensor will be tested using LCR meter to measure the capacitance values and the data obtained are varied by the geometry shape, electrode width and number of electrode of the FEF sensor. The results obtained proved that the geometry shape and sizing can improve the sensitivity of the FEF sensor.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Irrigation is the process of distribution of water to the soil or field area. It used to aid in the growing of farming crops, maintenance of landscapes and replanting of damaging soils in dry regions and during time of drought [1]. Irrigation divided into several types depending on ways of distribution of water from the supply to the distribution area. Several types of irrigation are surface irrigation system, localized irrigation system, drip irrigation system and most commonly used irrigation system is sprinkler or overhead system plus the conventional way by manually distributed water using bucket or watering cans. A good and efficient system of irrigation is necessary to maximize the cost and usage of water supplies. On the other hand, a poor irrigation can start a number of problems such as poor distribution equality or managing chemicals, wastes water and may lead to water contamination. Also deep drainage as of overused of water may affect in expanding water tables which in some instances will direct to problems of irrigation salinity needing water tables management by some form of subsurface land ditch [2]. In the present day, the struggle for water supply is much more intense. This is because of rapidly growing in human population on the planet, their spending of water-thirsty, meat and vegetable are increasing and there is rising struggle for water from city development, manufacturing and farming crops. People will have to make every effort to use water more efficiently while manufacturing and cities find new solutions to increase production to meet growing demands for food on the way to avoid a global water crisis [3].