



ANALYSIS AND EXPERIMENTAL STUDY OF OPTIMAL SOIL MOISTURE SENSOR PROBE LENGTH

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Abstract—two parallel needle moisture sensors has been widely used in Soil moisture detection equipment, for example, frequency domain (FD), time domain reflectometry (TDR) and standing wave ratio (SWR) measurement. The design of probe's port impedance is key technology parameters to soil moisture sensor. In this study, according to the relationships between the length and impedance characteristics of terminal open and closed state probe were presented based on two-pin probe structure of parallel resistance model. The best probe structure was simulated by high frequency structure simulator software HFSS, which based on Maxwell's equations and finite element method. According to experiment of soil water content by organic solution, the theoretical analysis of the best structure of probe was further validated.

Index terms: soil water content, sensor, length of probe, impedance