ABSTRACT

In the exploration of agricultural products, metals are the most sought after objects because they have many benefits. To determine the position of the depth of the metal source, one of the methods used is induction of a magnetic field which is an NDT (non-destructive testing) concept. The goal is to get the optimal coil parameters in detecting variations in metal depth.

With the characteristics of the coil used in measuring the depth of metals in the soil, it is expected to produce a significant measurement response from the variation in depth given. So this method can be a solution in detecting the depth of metals in the soil.

Experiments using 200, 300, and 400 coil pairs which show a decrease in the value of the voltage to the metal's position in the soil are 400 coil. The maximum depth value in determining the position of metals in the soil using 4 extrapolation approaches is limited to a depth of 4,5 cm because the measurement data obtained up to a depth of 3 cm. In ferrous metals, the maximum depth with the smallest voltage value uses logarithmic extrapolation $y = -0{,}454\ln(x) + 3{,}9168$ V_{rms} which is 4,5 cm position with a voltage value of 3,233 V_{rms}. In copper metal, the maximum depth with the smallest voltage value uses extrapolated linear partition $y = -0{,}12x + 3{,}374$ V_{rms}, which is 4,5 cm position with a voltage value of 2,834 V_{rms}. In aluminum metal, the maximum depth with the smallest voltage value uses logarithmic extrapolation $y = -0{,}9014\ln(x) + 4{,}2174$ V_{rms} which is 4,5 cm position with a voltage value of 3,861 V_{rms}.

Keywords: *Metal, NDT, Magnetic Field Induction, Coil, Soil*