

ABSTRACT

Electrochemical Impedance Spectroscopy (EIS) is an electrochemical metode that used for analyzing corrosion rates, battery or capasitor quality, and many more. There is still a few reasearch related to EIS development. One way to develop the function of EIS at the potensioestat part. This study aims to make a potensioestat that able to read frequencies input with range start from 1 Hz until 40 kHz with output that has correlance with the theory. The potentiostat circuit will be connected to a circuit called Randless Cell that consist two resistors and one capacitor. The Randles Cell function is to replace the work of three electrodes when used to measure a corrosion rates using EIS method. The three electrodes are working electrode, reference electrode, and counter electrode. The final result from the potentiostat circuit of this study is in the form of real and imaginary impedance value which are plotted together in one graph and form a semicircle graph curve. The plot of the graph called Nyquist Plot. The result from data collection in this study showed for capacitor 1 uF the percent error average value for real impedance is 9,3% and imaginary impedance is 43,7%. For capacitor 10 uF the percent error average value for real impedance is 2,289% imaginary impedance is 22,7%. For capacitor 100 uF the percent error average value for real impedance is 10,8% and imaginary impedance is 51,2%. The potentiostat circuit able to detect a broken capacitor in Randles Cell circuit proven on the testing using a broken capacitor resulting a Nyquist plot graph that has an extreme anomaly. The anomaly is in the form of real and imaginary impedance produced by the potentiostat circuit is very inaccordant compared to the theoritical impedance calculation.

Keywords: *Electrochemical Impedance Spectroscopy (EIS), Electrode, Potentiostat.*