

## ABSTRACT

In electronics, a wave is a change in voltage within a certain time or duration. One of the tools that can generate wave signals is a wave generator or commonly called a function generator. Direct Digital Synthesis (DDS) technology is undergoing significant development over the last few years. Some of the advantages of DDS are very high signal resolution, continuous frequency and phase conversion, simple synthesis, and easy extensibility. One of the tests that using a function generator is Electrochemical Impedance Spectroscopy (EIS). In the EIS test, a function generator with a high resolution is required, namely a signal with a very low frequency value. To solve this problem, a function generator has been designed that works with the DDS system in generating control signals using an easy-to-use interface for use in EIS testing. In this study, IC AD9833 acts as a generator, Arduino Uno as a controller input, and MCP41010 as an amplitude controller. This tool will also be programmed so that the resulting frequency signal can change automatically within a certain time range (sweep). From this research, it was found that the AD9833 module can produce wave signals with a frequency of 1-100 KHz with an amplitude from 100 mV to 3.5 V. From the results of data collection on the EIS test, the results of data collection of circuit impedance have an error of 600% or 6 times greater than the theoretical impedance value. This is due to a systematic error, where there is no DC offset required for the device's output AC signal to be carried. Therefore, the data needs to be corrected in order to compare the working response of the tool based on the impedance value of the tool with the theoretical impedance value.

**Key words:** *Sine Wave, function Generator, DDS, EIS, AD9833 Module, Sweep*