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The Smartphone and Low-Cost Microcontroller as an AC Circuit Study Kit for high-school students

This article presents a smartphone and Arduino microcontroller-based AC circuit educational module focusing on the measurements of an alternating voltage, frequency, phase difference, and a phasor diagram. A smartphone provides a signal generator as a signal source, the Arduino UNO R3 working for signal acquisition, and the breadboard RC series circuit as a test circuit. In-house developed software, based on Microsoft Visual Basic (VB), was used for monitoring the input signal like an oscilloscope. The measured frequency and phase difference agree with the results obtained from the commercial oscilloscope benchtop. This developed module is an apparatus that may be useful in online learning situations with the home experiment during the COVID-19 pandemic and used in high school that lacks the instruments, i.e., function generator and oscilloscope.

Keywords: Arduino, Oscilloscope, RC series circuit, Smartphone

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