Name(s)	Project Number
Abraham P. Karplus	**31076**

Project Title

Set Phasors to Analyze Circuits

Abstract

Objectives/Goals
My purpose with Set Phasors to Analyze Circuits was to create an electrical circuit analyzer, which is a computer program that can find the current and voltage of an electrical circuit (containing resistors, inductors, capacitors, voltage sources, and current sources). Note that no actual circuit is involved; rather, it is all modeled on the computer.

Methods/Materials
I wrote the program in the Python programming language with the help of the Numpy and PyGUI packages, for matrix math and a graphical user interface respectively. It uses the extended sparse tableau algorithm for finding voltage and current, and uses phasors, complex numbers representing a sinusoid, to allow it to handle alternating current with the same code as direct current.

Results
The program produces the correct results and can plot them on a graph or output as an RDB file for analysis or plotting with an external program. It has a graphical user interface, though still uses text entry for the circuit model input. It can "sweep" multiple AC frequencies to demonstrate the frequency response of the circuit.

Conclusions/Discussion
I successfully created a circuit analyzer, and learned a lot of programming skills and circuit theory. Note: My actual abstract in my report contains a lot more circuit theory, but the hypothesis-experiment-result formatting of this abstract submission form does not let me go into detail.

Summary Statement

I created an electrical circuit analyzer, a computer program that models a cicruit to find its current and voltage.

Help Received

My dad, Kevin, helped me learn Python and circuit theory. My mom, Michele, supported me on the project.