AC circuit impedence calculator

Object Oriented Programming final project

Dónal Murray 8381250

objectives,method,results: Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Introduction

Most complicated electronics like computers and smartphones make use of direct current (DC) for their power as the voltage and current are both constant. This means that the components do not have to deal with the stresses and instability associated with an alternating current (AC) power source. AC power sources do not have a voltage which is constant in time; rather it varies periodically between a maximum positive voltage and minimum negative voltage, passing through zero volts along the way. This introduces some difficulties into the circuit theory, when compared with DC. The best way to deal with the mathematics of AC circuits is to use complex numbers. The magnitude of the complex numbers is then taken to find the actual values like resistance and capacitance.

This report aims to outline the design and implementation of a program written in C++ to calculate the impedence of AC circuits consisting of ideal resistors, capacitors and inductors in any combination in series or parallel.

C++ is an object oriented programming language created by Bjarne Stroustrup in 1983 [3]

AC circuit theory

Ohm's law for AC circuits is

$$E = \frac{I}{Z}, \tag{1}$$

where...[4]

Code design and implementation

vectors
pairs
smart pointer
lambda
namespaces
lists
function template
class template
associative containers
static data
multiple files
headers

Extended Functionality

Non-ideal components
Nested components
Nice output
Output tex file with a tikz drawing of the circuit diagram which can be compiled locally or using the cloud convert (https://cloudconvert.com/api/console) API to convert the tex file to pdf

Figure 1: [1].

Figure 2: [2].

Results

illustrate how the code is used including input and output details

Discussion

how could code be improved or extended beyond the project
added functionality

References

[1]

[2]

[3]

[4]