

## Auto-Ranging RLC Meter

BEng (Hons)  
Electronic Engineering

### Background:

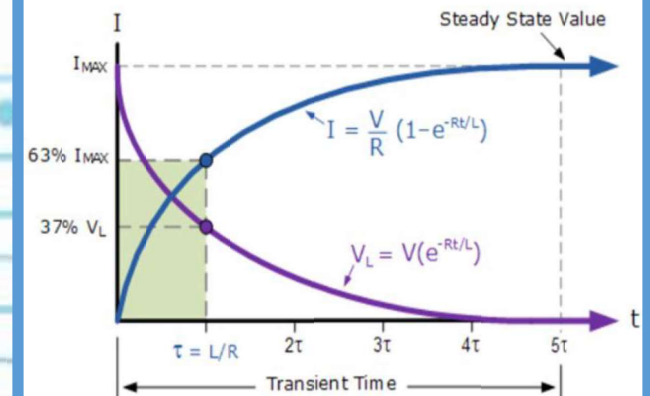
A lot of existing RLC (resistors, capacitors and inductors) meters only allow for single modes which can be selected with the use of a dial. Newer products now have auto-ranging capabilities, but they can be expensive

To counteract this, an auto-ranging aspect will be added, providing the user with the component type and value once it is connected.

### Solution:

The product would contain a voltage divider with one unknown RLC component. An LC component can be found with their respective time constant equations. While unknown resistors can be found by measuring the voltage across it and using Ohm's Law.

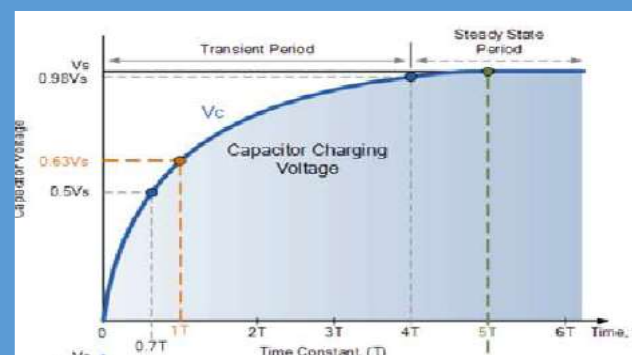
A PWM input would allow the LC components to charge and discharge equally, with the initial cycle being used to calculate the time constant



By measuring the voltage, across the unknown inductor the time constant can be calculated to determine the value of an inductor's inductance.

### Problem:

With having no dial to select modes, the product will need to automatically select the type of component and then find the value of the respective component accurately.



By measuring the voltage across the unknown capacitor, the time constant can be calculated to determine the value of an capacitor's capacitance.

### Results:

The PWM input did initially work as intended with frequencies of 300Hz and 30kHz, however, later frequencies of over 90kHz were recorded which should not be the case.

This could be down to the lifespan of the digital potentiometers purchased resulting in wayward results.

This encountered problem caused the lack of testing with "unknown" LC components.

Name: Daniel Hawkins

Student Number: Q12905895