**From:** Huxley Rust  
**Date:**  28/05/2025  
**Subject:** Analysis of the transient response of an RLC circuit

**Introduction**

**RLC Circuit Analysis**

* **Measured Component Values:**
  + As a result of the inductor in our circuit having a resistance of 399Ω we adapted the circuit and instead used a 22Ω resistor. This combined with the 50Ω resistor caused by the function generator was enough to get us to our desired value of 470Ω. Later, instead of using the 2200Ω resistor we opted to add together a 1500Ω resistor and a 330Ω resistor (combined with the 399Ω from the inductor) to get to 2200Ω. And eventually when we were attempting to reach critically damped, we used a 1500Ω, a 68Ω, and a 22Ω resistor (combined with the 399Ω from the inductor) to attempt to reach a critically damped attitude in our circuit.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **L** | **C** | **RL** | **R22Ω** (UD) | **R1.5kΩ + 330Ω** (OD) | **RCD** (CD) |
| **Expected** | 100mH | 0.1 µF | - | 22Ω | 1830Ω | 1590Ω |
| **Measured** | 104mH | 0.107 µF | 399.0Ω | 21.785Ω | 1801Ω | 1567Ω |

* + As I previously stated, the inductor’s resistance played a pretty major role when constructing this circuit and attempting to reach the Underdamped (UD), Overdamped (OD), and Critically Damped (CD) attitudes in our circuit. Other discrepancies were that when measuring resistances for OD and CD we did not consider the 50Ω resistance of the wave form generator because that resistance was such a small part of the total resistance in the circuit. This won’t have caused us accidentally to create an OD situation when we were trying to measure a UD, but it will have caused our Pre-Lab calculations to be a bit off (even more than they would have already been due to the imperfect component values).
* **Waveform Comparison:**