

Effects of R_p , C_{dl} , R_{layer} , C_{layer} and R_{el} on the shape of the EIS spectra

<https://spectrum-param-2tc-nested-fbac874d0a07.herokuapp.com/>

This app is a tool for visualizing the impedance behavior of a more complex equivalent circuit, consisting of multiple resistance and capacitance components. The circuit consists of an electrolyte resistance in series with a two-branches circuit. In one branch there is a capacitance (C_{layer}), while in the other branch there is a series between a resistance R_{layer} and the parallel between a resistance R_{ct} and a double layer capacitance C_{dl} . Users can adjust the five key parameters using logarithmic sliders: electrolyte resistance (R_{el}), layer resistance (R_{layer}), layer capacitance (C_{layer}), charge transfer resistance (R_{ct}), and double-layer capacitance (C_{dl}).

Key Features:

1. **Component Selection:** The app allows users to configure the circuit components using sliders that adjust the values of the resistances and capacitances.
2. **Frequency Range Selection:** Users can select a specific frequency range for their analysis, with the app computing impedance over a wide range (0.001 Hz to 100,000 Hz) and allowing a narrower frequency range to be visualized.
3. **Plots:**
 - **Bode Plot - Modulus:** This plot shows the log of the impedance modulus as a function of the log frequency. It gives insights into the magnitude of impedance across the selected frequency range.
 - **Bode Plot - Phase:** This plot visualizes the negative phase of the impedance in degrees versus the log frequency, helping users understand the phase behavior of the circuit.
 - **Nyquist Plot:** The real versus negative imaginary parts of the impedance are plotted, providing a classic Nyquist representation of the circuit's complex impedance.
4. **Plot History:** Each time the sliders are adjusted, the app saves the previously computed impedance data, allowing for comparisons between different configurations.
5. **Autoscale and Reset:** Users can toggle autoscaling for the Bode plots' y-axes, and a reset button clears previous data, ensuring clean visualizations for new configurations.