

Laplace Transform

Laboratory III

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- 1 Goal of the exercise
- 2 Laplace Transform
- 3 Course of measurements

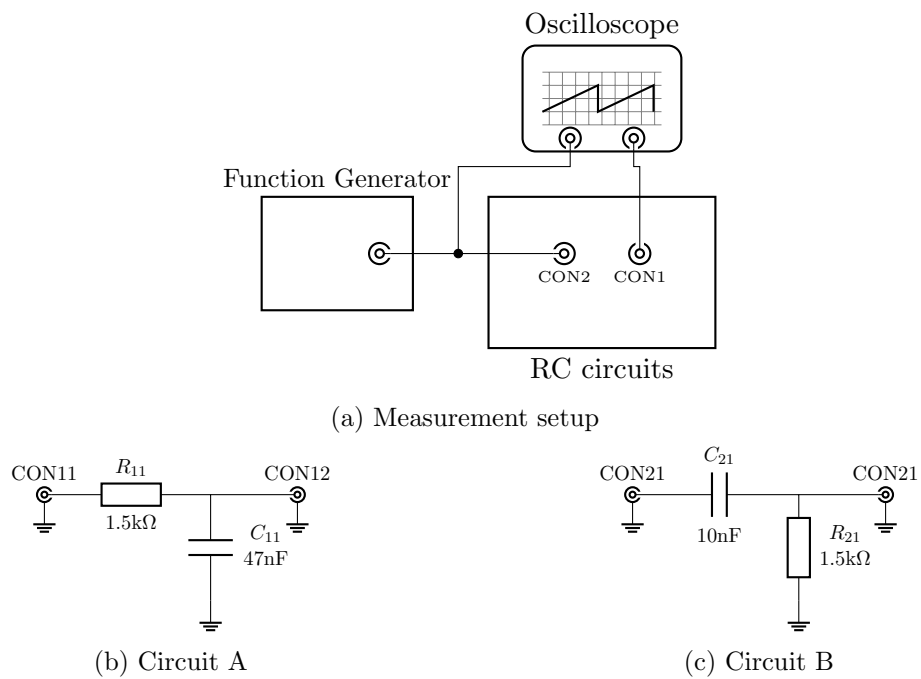


Figure 1: RC Circuits

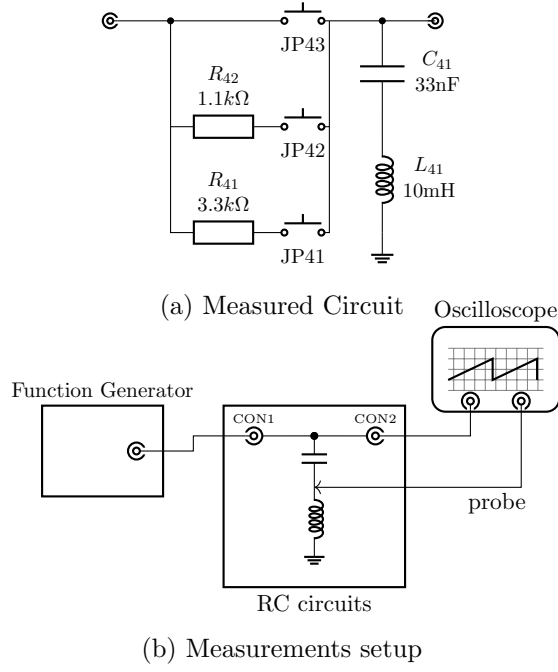


Figure 2: RLC circuit

4 Theoretical calculations

For all calculations we used Matlab with Symbolic Math Toolbox. Source code can be found in Appendix. A

In all three circuit input voltage was square wave with 50% duty cycle which can be described in time domain by

$$v_{in}(t) = V_{offset}\mathbf{1}(t) + V_{pp}\mathbf{1}(t - \frac{T}{2}) - V_{pp}\mathbf{1}(t - T) \quad (1)$$

and after Laplace transform into frequency domain

$$V_{in}(s) = \mathcal{L}[v_{in}(t)] = \frac{V_{offset}}{s} + \frac{e^{-2Ts}}{s} - \frac{e^{-Ts}}{s} \quad (2)$$

4.1 Circuit A

4.2 Circuit B

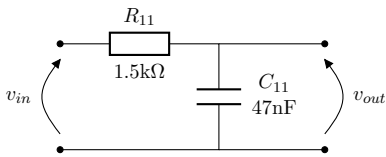


Figure 3: Circuit A schematics

4.3 Circuit C

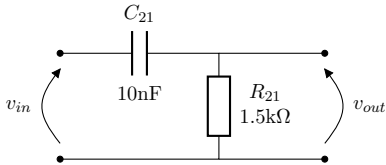


Figure 4: Circuit B schematics

5 Comparison

6 Conclusions

A Appendix

