

# EEE 202 CIRCUIT THEORY

## LAB 2

Design a passive linear circuit to generate high voltage spikes from 10V peak-to-peak square wave with a source resistance of  $50\Omega$  and frequency less than 5MHz.

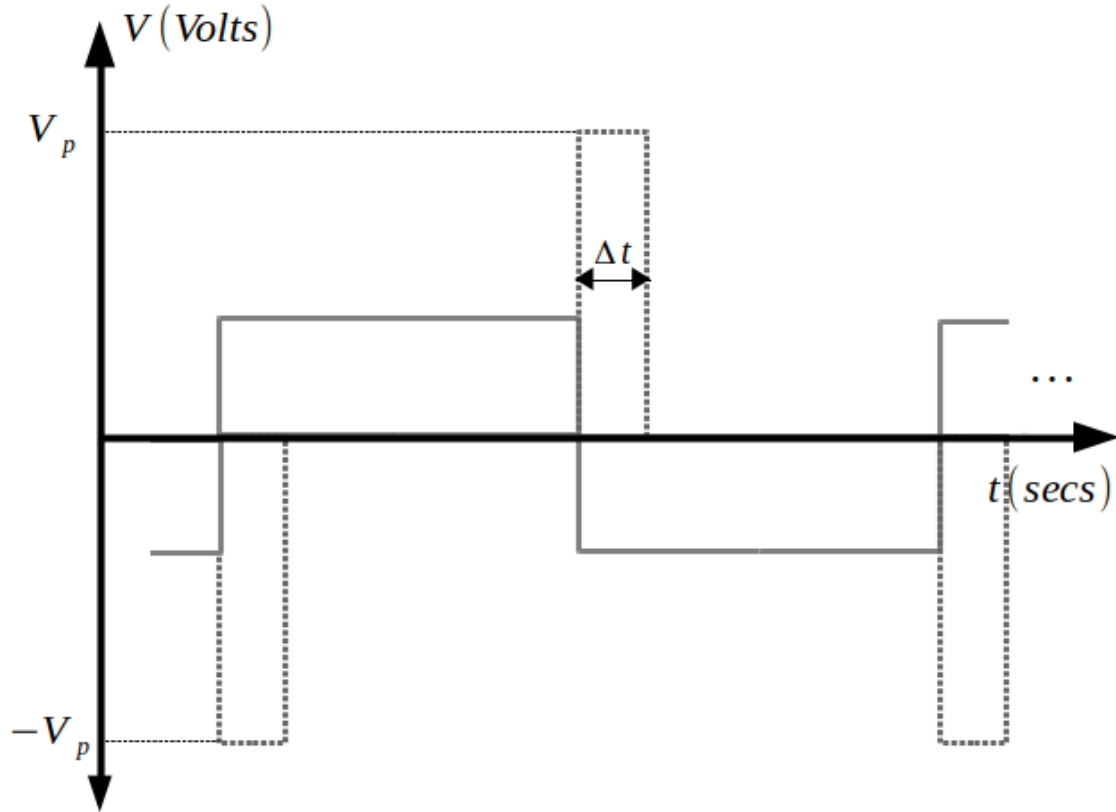


Figure 1: Input is a square pulse (gray line). Output is shown by dashed lines.

Peak value,  $V_p$ , of the voltage spikes must be  $20V \leq V_p \leq 25V$ . **Full width at half maximum (FWHM)**, must be less than 100ns ( $\Delta t < 100ns$ ). Note that spikes are not required to be square shaped. Assume that fall and rise times of the square wave are 10ns.

**Please make sure that the spike duration is much *shorter* than the input period!**

### Software lab

Verify your proposed method using SPICE.

### Hardware lab

Implement your design. Measure fall, rise times and peak value of the square wave by connecting a  $47\Omega$  resistor across the terminals of the signal generator. Measure the peak voltage and half-amplitude width of the output. Compare expected and observed values.

### Available materials in the lab

Toroidal cores (T25-10, T37-7, T38-8, T50-7) to wind transformers, capacitors and resistors with standard values.