

ic555\_pwm.sqproj

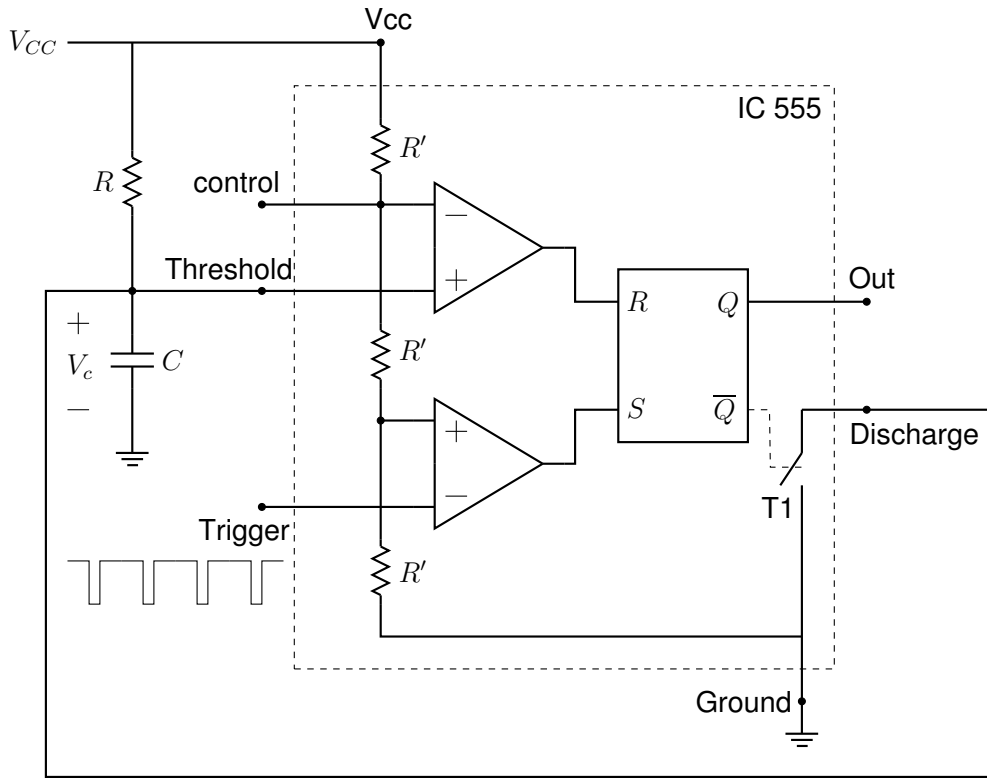


Figure 1: 555 timer used for pulse width modulation.

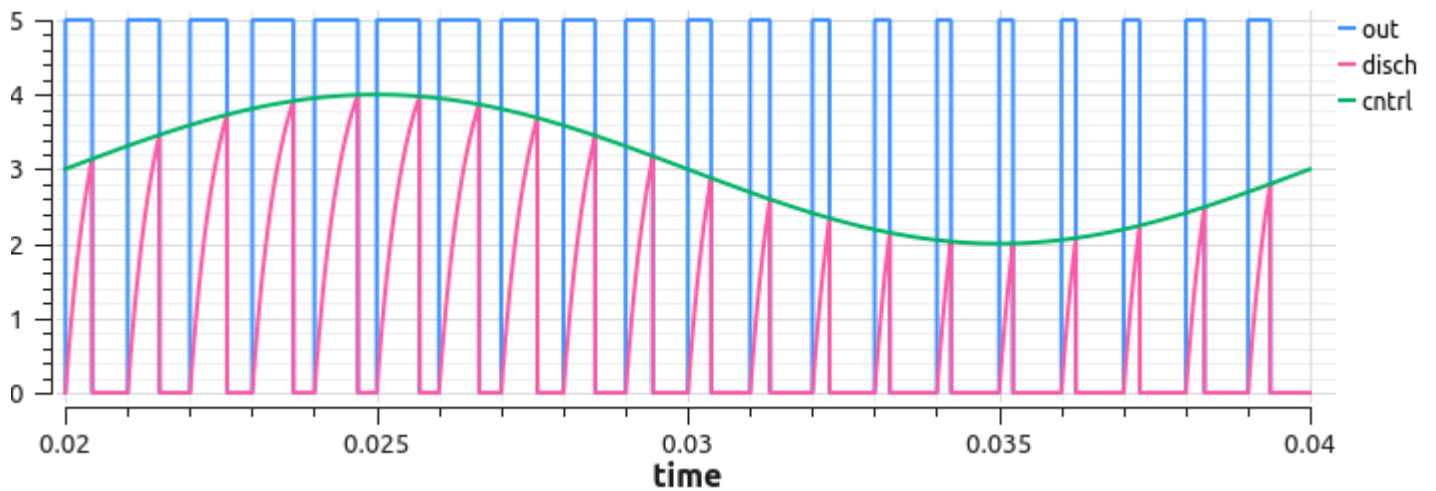


Figure 2: Waveforms for the circuit of Fig. 1.

The control input (see Fig. 1) of a 555 timer can be used to generate PWM pulses. The

clock is connected to the **trigger** input, and the modulating input (in this case, a sinusoidal voltage with a DC offset, viz.,  $V(t) = 3 + \sin \omega t$  V) is connected to the **control** input.

With a negative-going edge at the clock signal, the flip-flop gets set to  $Q = 1$ , the discharge switch opens, and the capacitor  $C$  starts charging toward  $V_{CC}$  through the resistor  $R$ . When the capacitor voltage  $V_C(t)$  crosses the control voltage (the inverting input of the top comparator), the flip-flop gets reset to 0. Since the control voltage varies with time, the output pulse width also varies, as shown in Fig. 2.

## Exercise Set

1. Run the simulation, and verify the operation of the circuit as described above.
2. What will be the pulse width if a constant DC voltage of 3 V is applied to the control input? Verify with simulation.

Repeat for 4 V, 5 V.