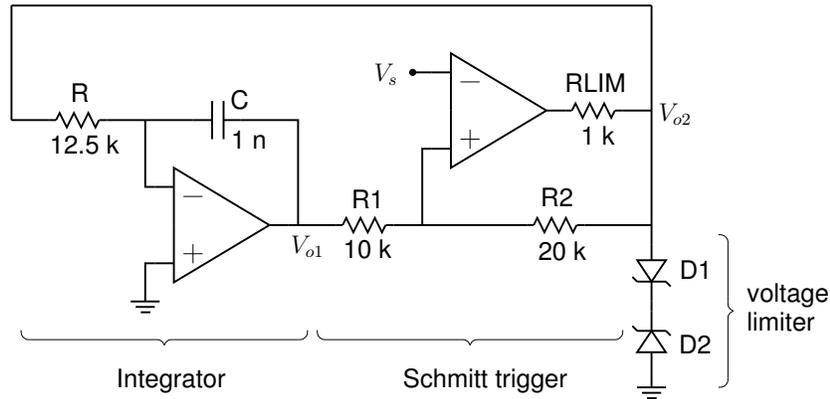## opamp_osc_1.sqproj

Shown in the figure is an oscillator circuit which produces a triangle wave at V_{o1} and a square wave at V_{o2}. The Zener diodes serve to limit the output voltage to $\pm(V_Z + V_D)$.

Exercise Set

1. For the component values given in the figure and with $V_s = 0\,V$,

    (i) Sketch the V_o versus V_i characteristic for the Schmitt trigger.

    (ii) Find the relationship between V_i and V_o for the integrator.

    (iii) What is the frequency of the oscillations?

    (iv) What are the minimum and maximum values of $V_{o1}(t)$?

2. Repeat 1 for $V_s = 2\,V$.

3. Repeat 1 for $V_s = -2\,V$.

4. What is the purpose of the resistor `RLIM`?

Verify your results with simulation.

References

1. S. Franco, *Design with Operation Amplifiers and Analog Integrated Circuits,* McGraw-Hill, 1998.

2. J. Millman and A. Grabel, *Microelectronics,* McGraw-Hill, 1988.

3. A. S. Sedra, K. C. Smith, and A. .N. Chandorkar, *Microelectronic Circuits*, Oxford University Press, 2004.