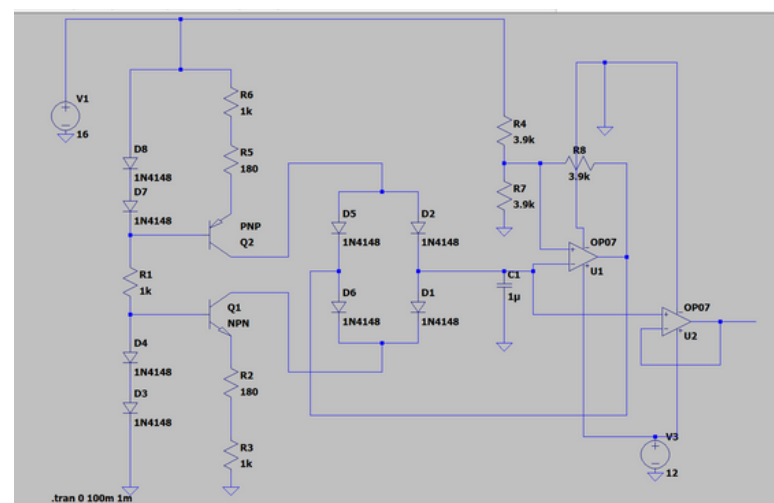


DESIGN OF A SWEEP GENERATOR

DESCRIPTION

To design a sweep generator which can be operated using a DC Supply and generate a triangular sweep signal at the output.

REFERENCE TAKEN FROM INTERNET



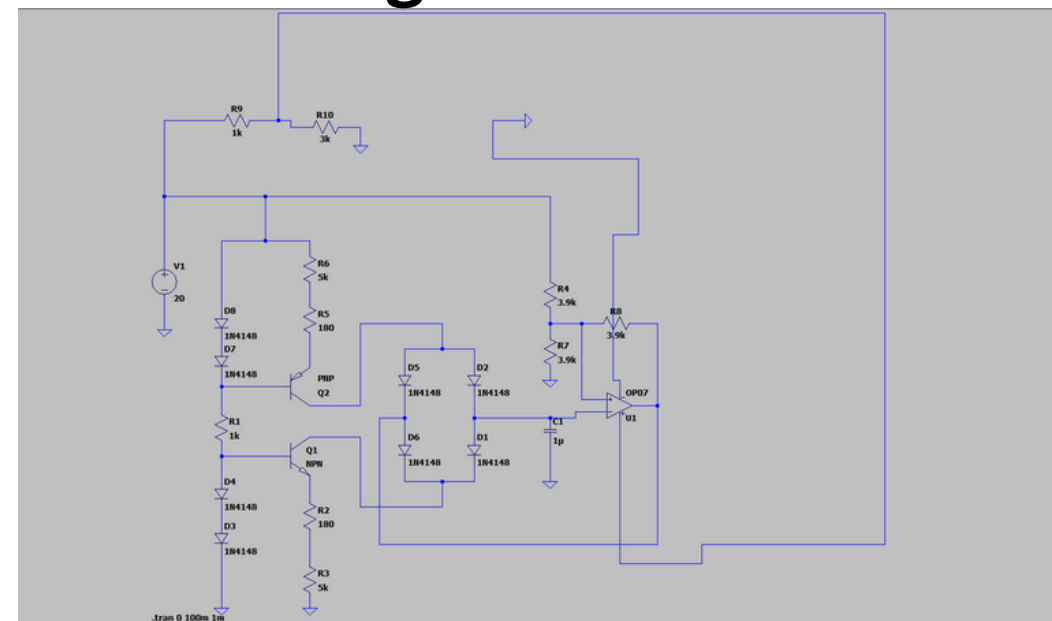
Problems faced in the above circuit

1. There are two power supplies in the original circuit
2. There is an extra op-amp used as a buffer which we won't need to show the output.

References

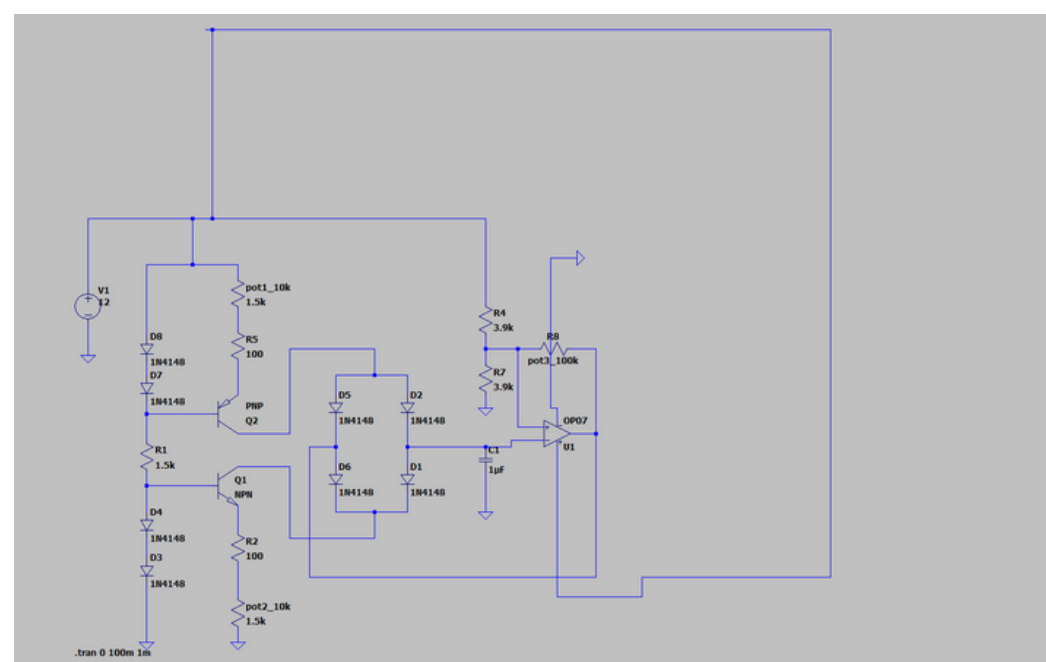
1. <https://www.circuitbasics.com/what-are-sawtooth-and-triangle-wave-generators/>
2. 104: Circuit tutorial: sawtooth generator w/ current sources, diode switches, hysteresis comparator - YouTube
3. <https://patents.google.com/patent/CA1198176A/en>

Revolutionizing the Original Circuit



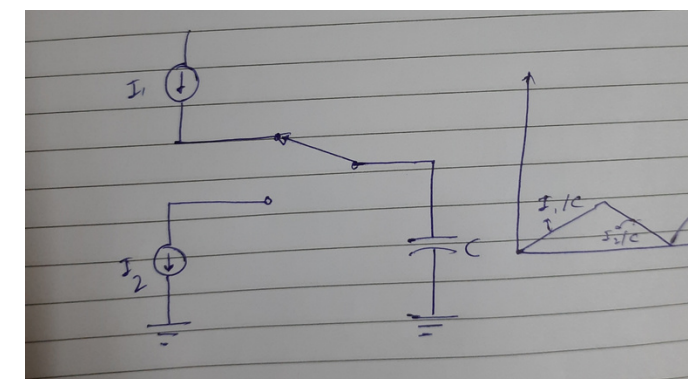
Then we thought of dividing the voltage using voltage divider. But by simply changing the values of voltage on LTSpice we realized that there is no need of the other voltage.

Final Circuit



Basic Idea of thought

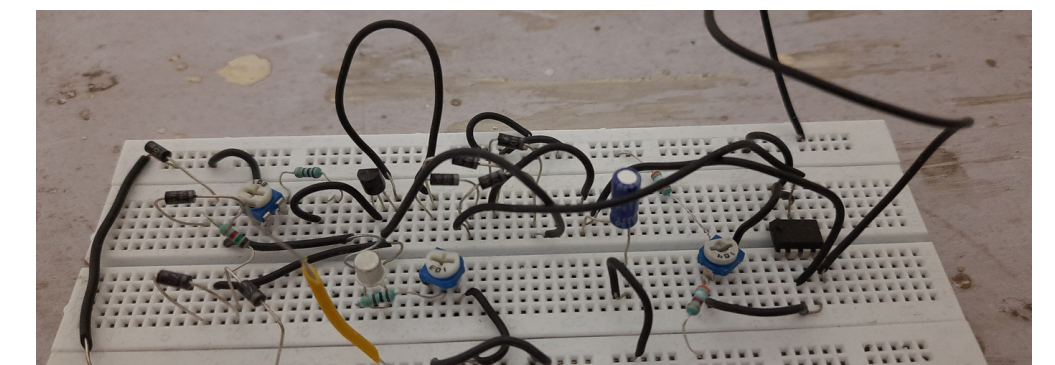
The charging and discharging of capacitors using current sources because the slope of the rising edge and falling edge varies as I/C .



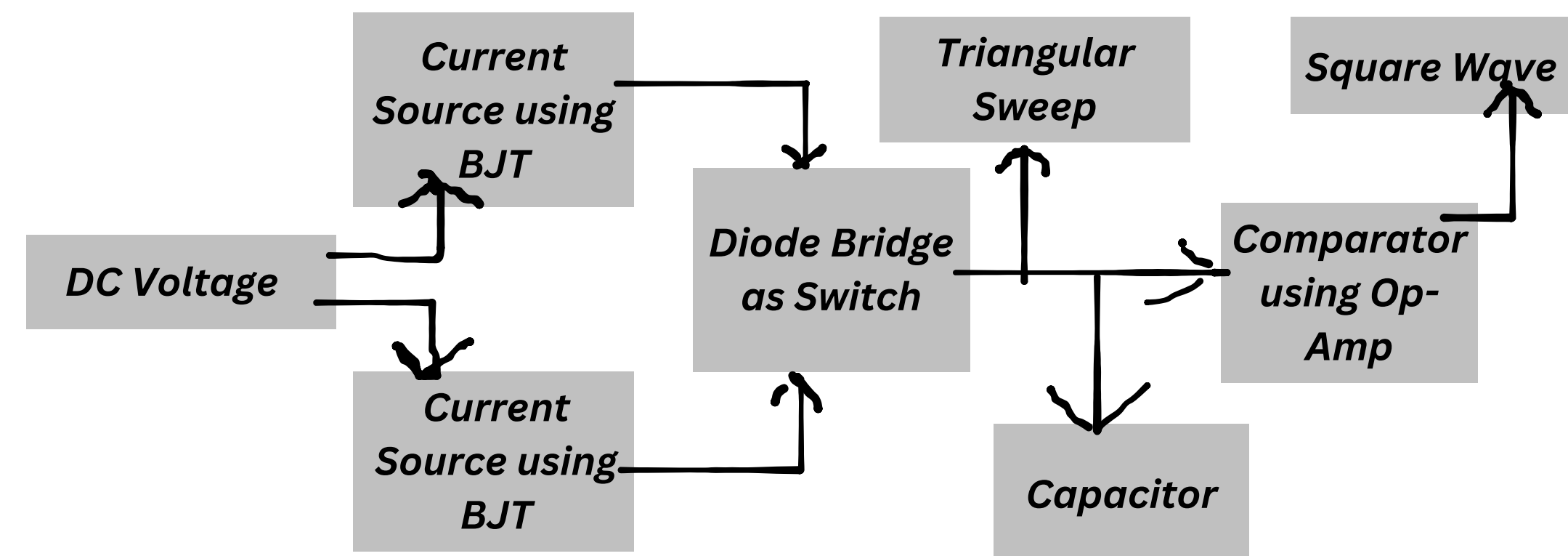
DSO Output



Breadboard Circuit



Block Diagram



Features of Sweep Generator

1. It generates a triangular sweep whose rising and falling edges can be controlled by the potentiometer.
2. The Amplitude of the triangular wave can also be controlled by changing the potentiometer value.
3. The generator can generate a sawtooth with T(falling), which is negligible compared to T(rising).
4. The output is available all the time as the DC voltage is given to the circuit.

Applications

1. It is used in Cathode Ray Oscilloscope to generate a Sawtooth Sweep Signal for moving the trace of the beam on the x-axis to plot a waveform amplitude w.r.t to time.
2. Switched-mode power supplies and induction motor-control circuits often use a triangular wave generator as a part of the Pulse Width Modulator(PWM) circuit.
3. Triangular sweep generators can also be used in signal processing applications, such as signal conditioning or filtering.