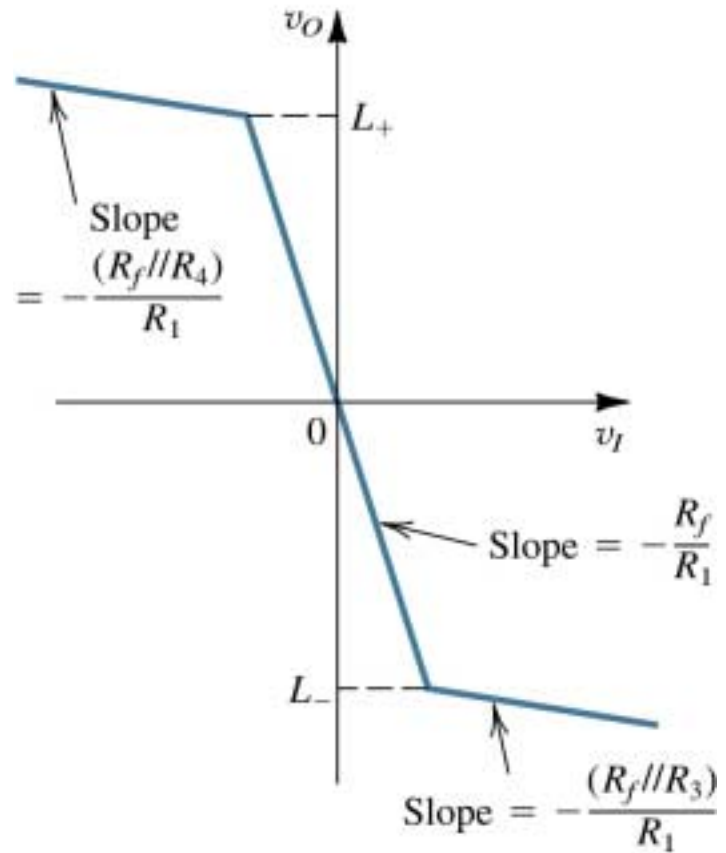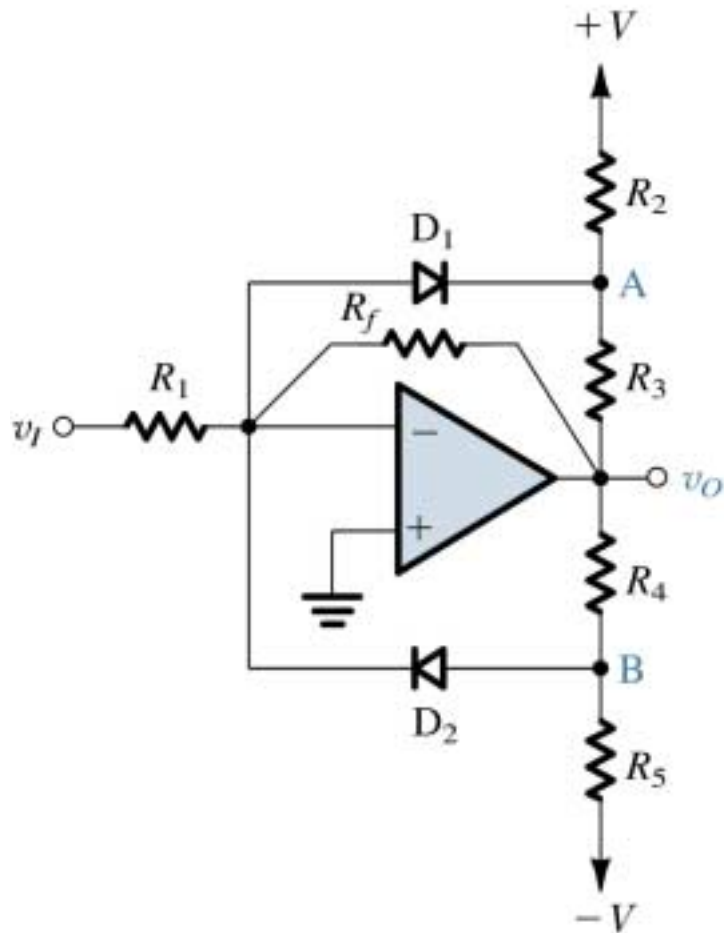EE-4232
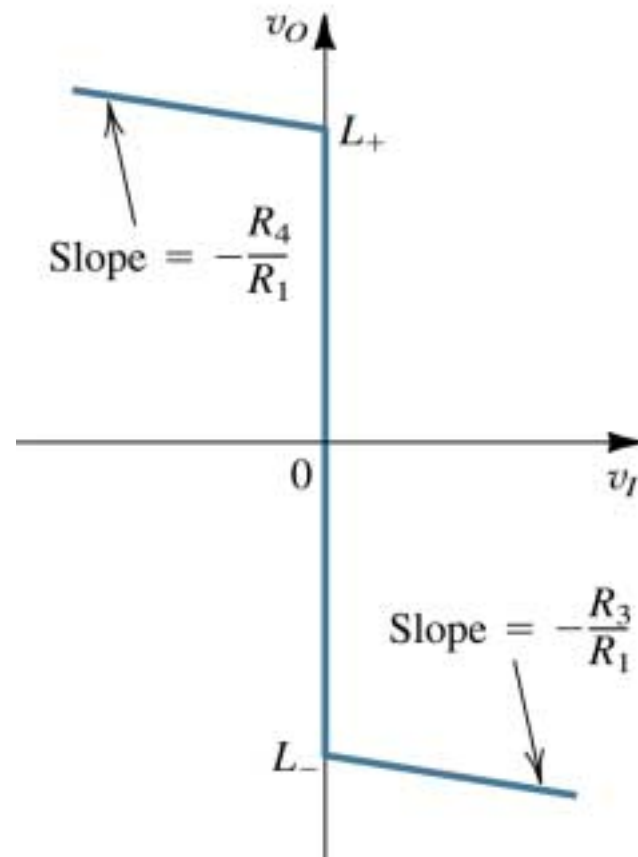
Wave Shaping Circuits
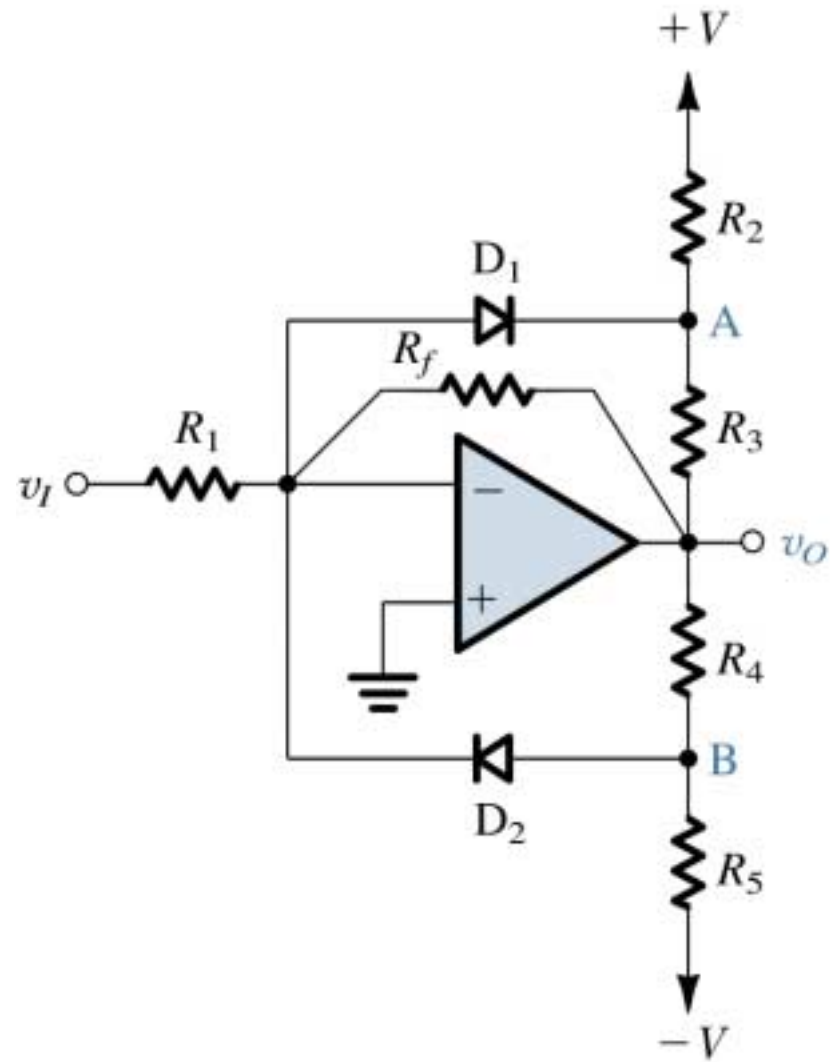
A popular limiter circuit.

+V

R_2

D_1

A

R_f

R_1

v_I

R_3

v_O

+

R_4

B

D_2

R_5

−V

v_O

L_+

Slope
$$= -\frac{(R_f//R_4)}{R_1}$$

0

v_I

Slope $= -\dfrac{R_f}{R_1}$

L_-

Slope $= -\dfrac{(R_f//R_3)}{R_1}$
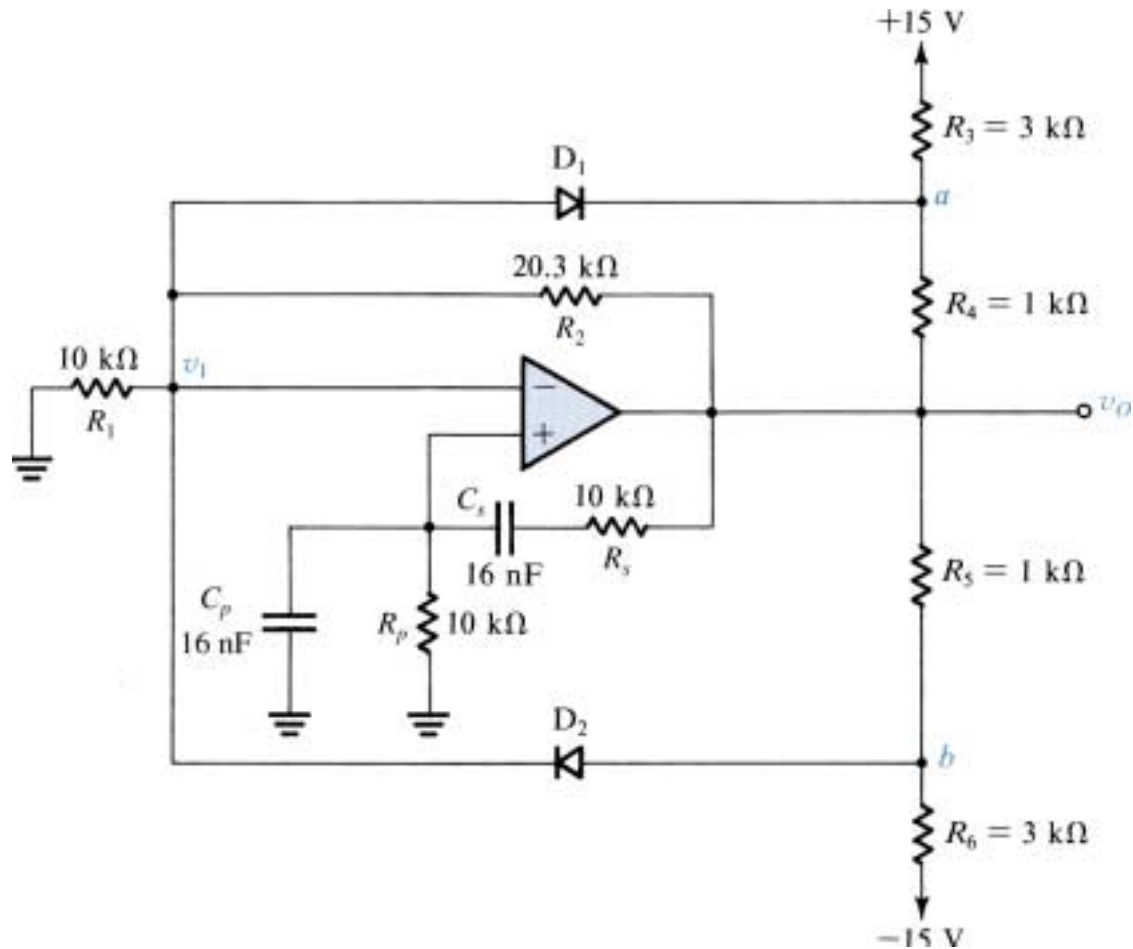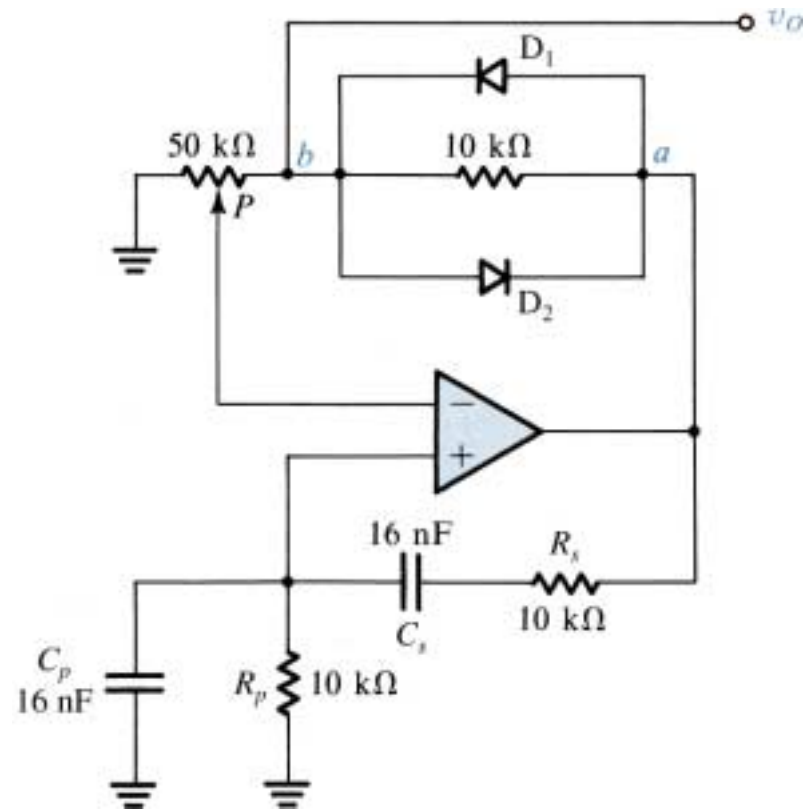
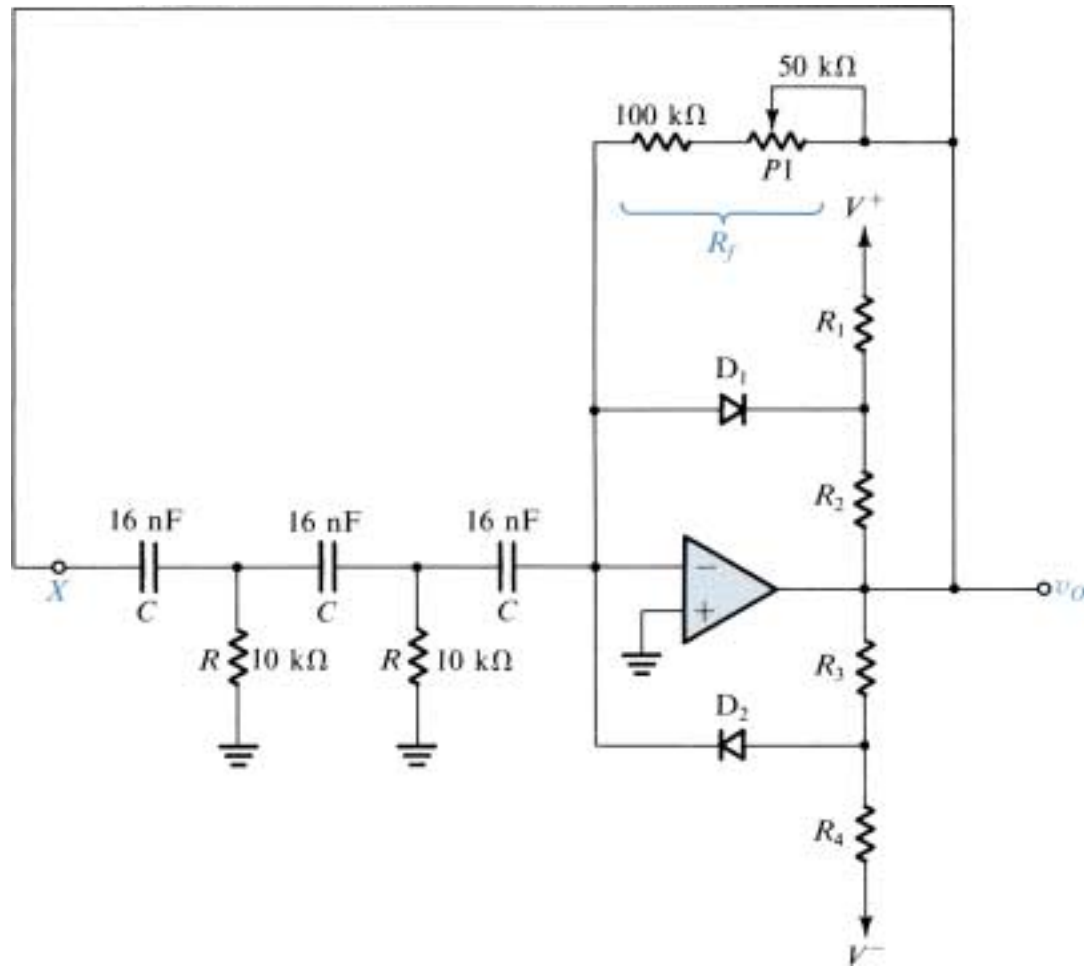Transfer characteristic of the limiter circuit

2
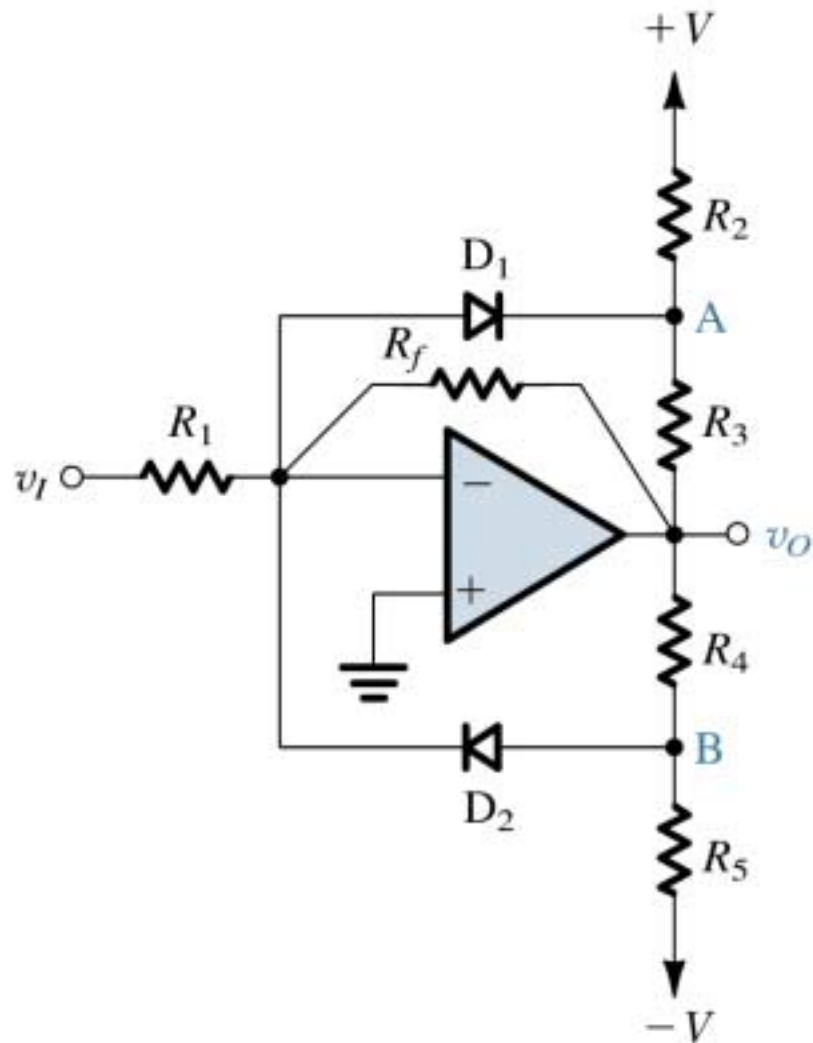
When R_f is removed the limiter turns into a comparator with characteristics shown.
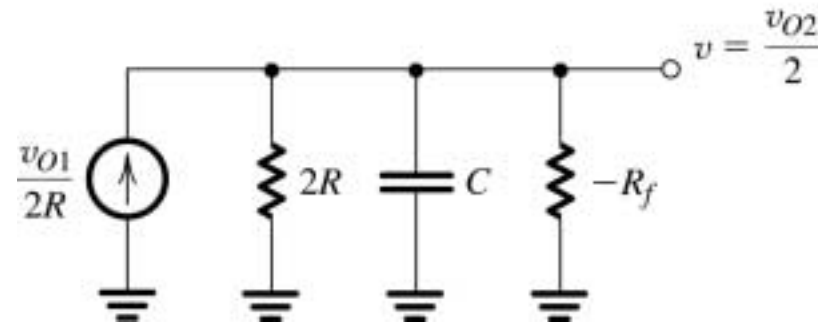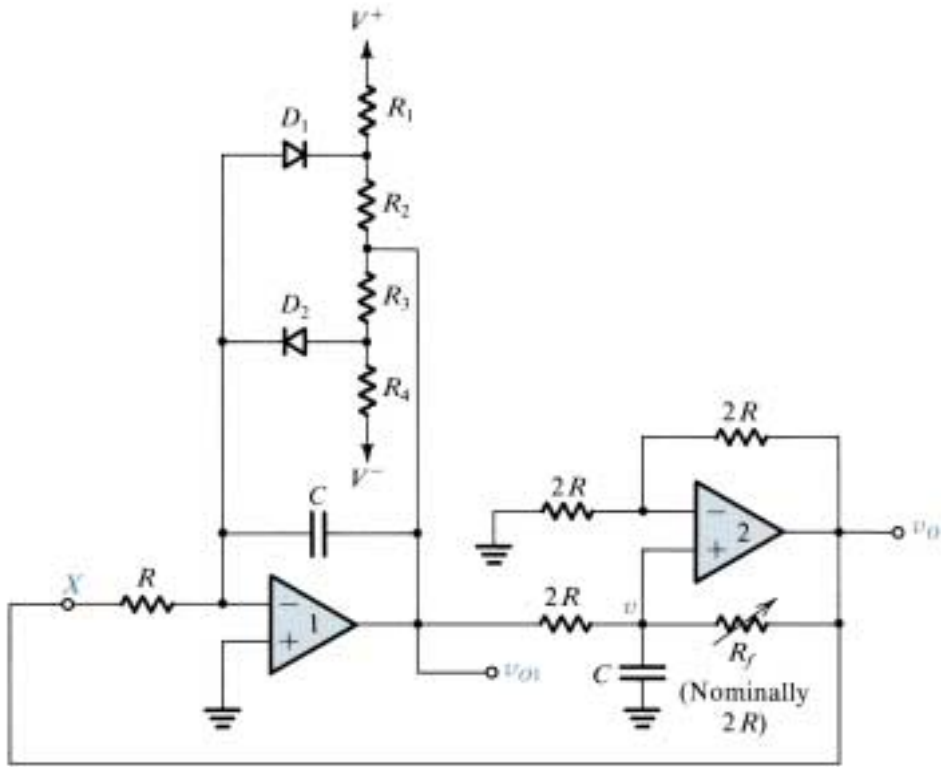
A Wien-bridge oscillator with a limiter used for amplitude control.

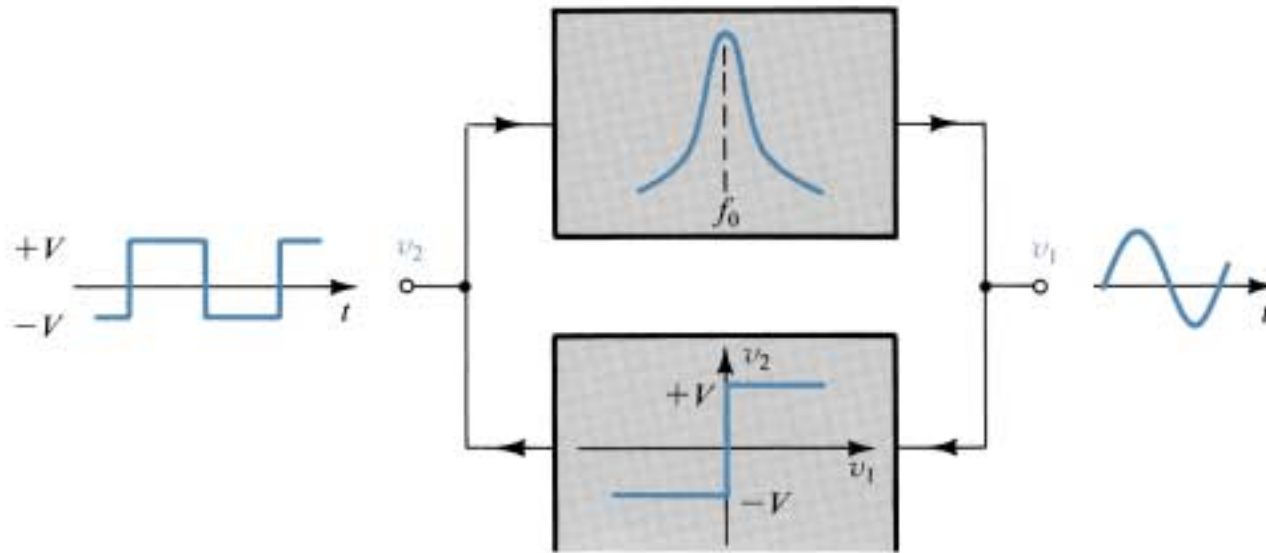A Wien-bridge oscillator with an alternative method for amplitude stabilization.

Practical phase-shift oscillator with a limiter for amplitude stabilization.
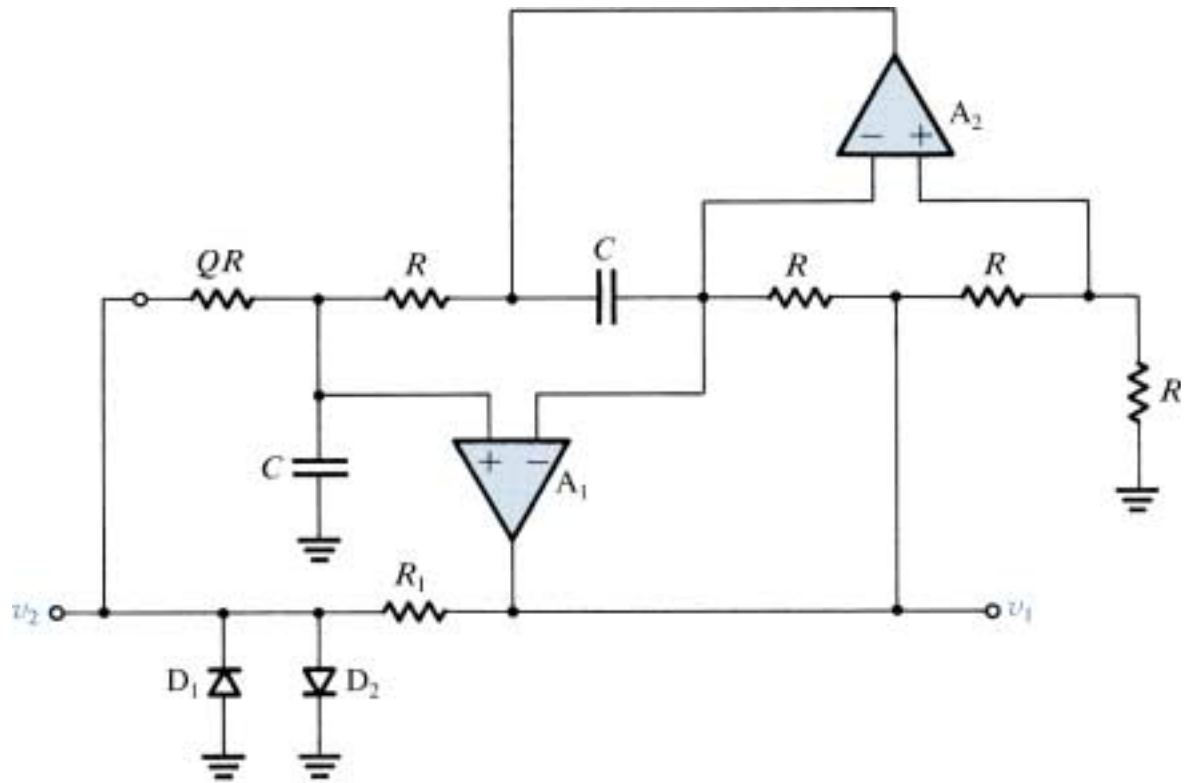
(a) A quadrature oscillator circuit. **(b)** equivalent circuit at the input of op amp 2.
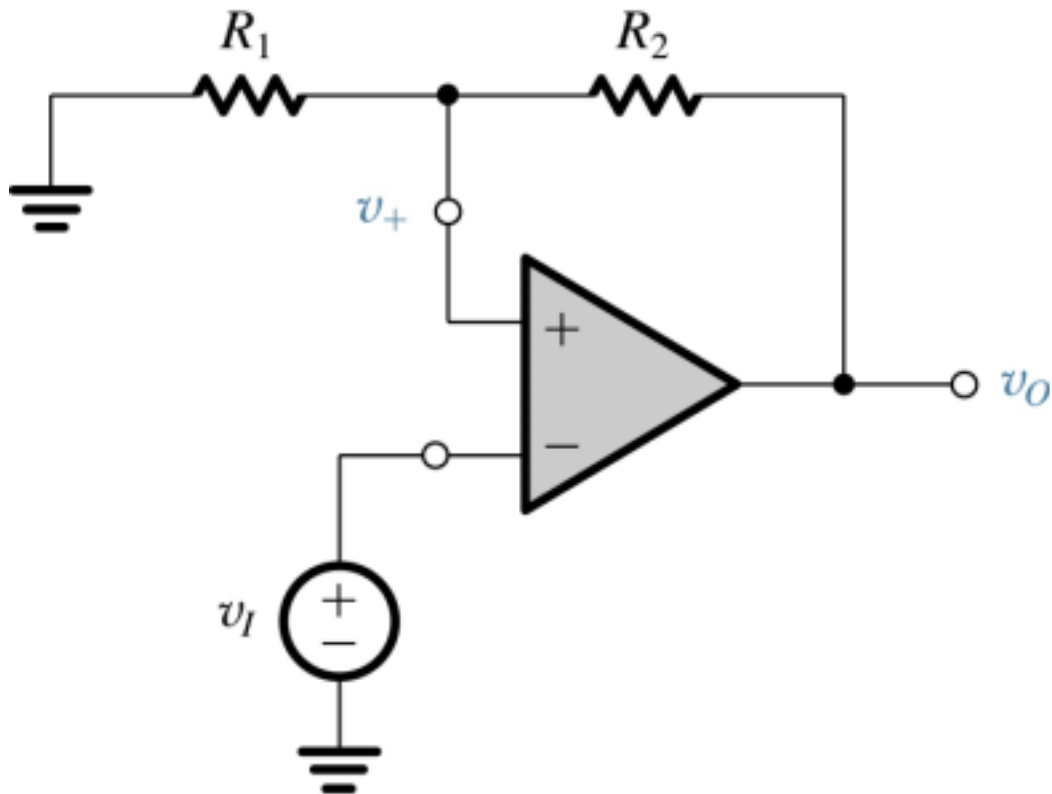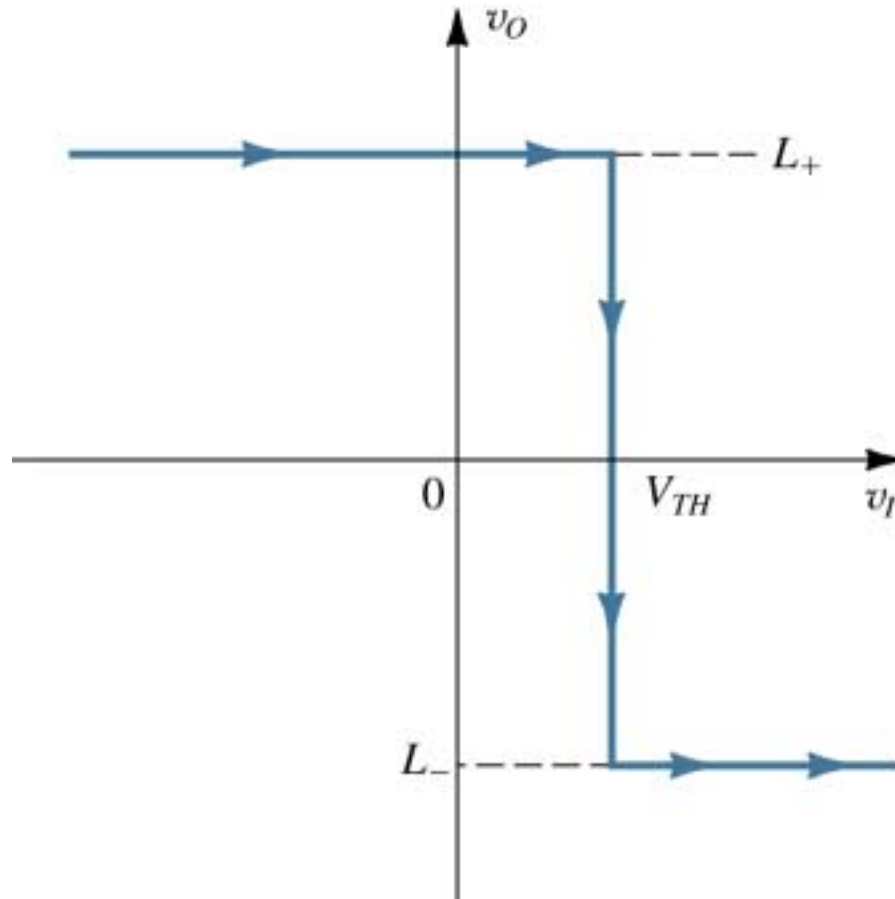
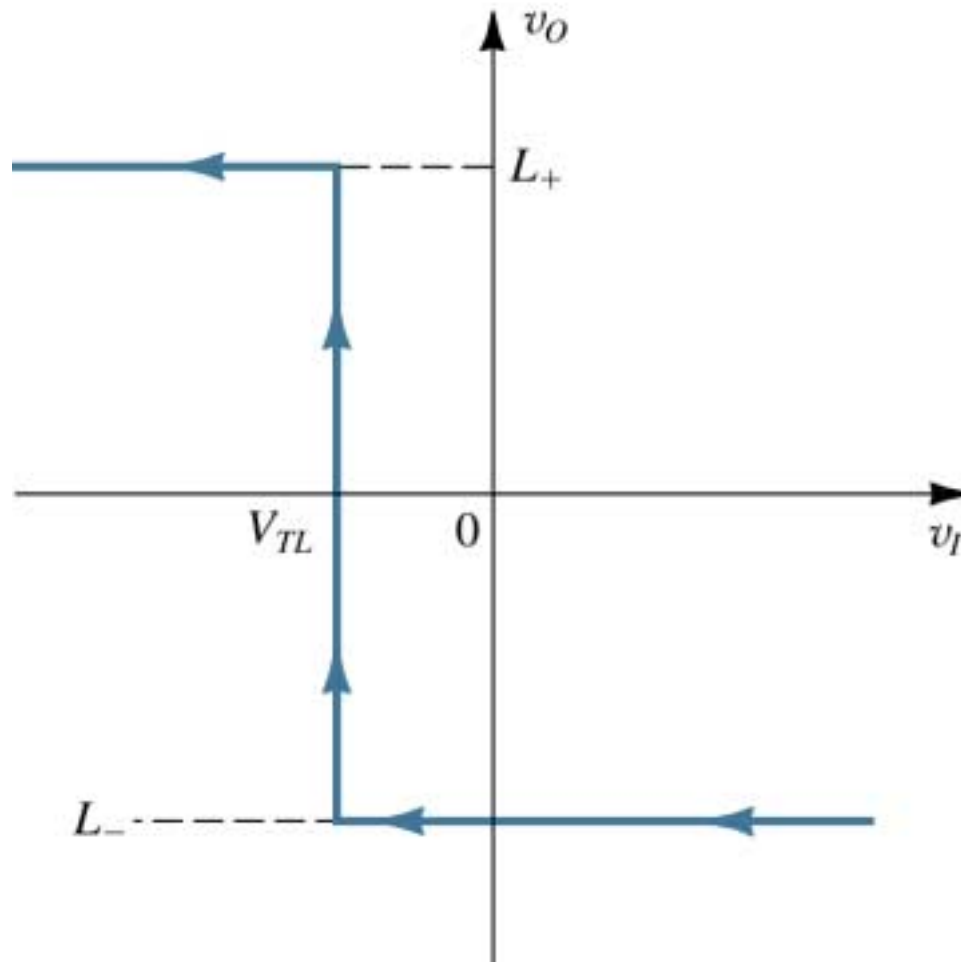Block diagram of the active-filter tuned oscillator.

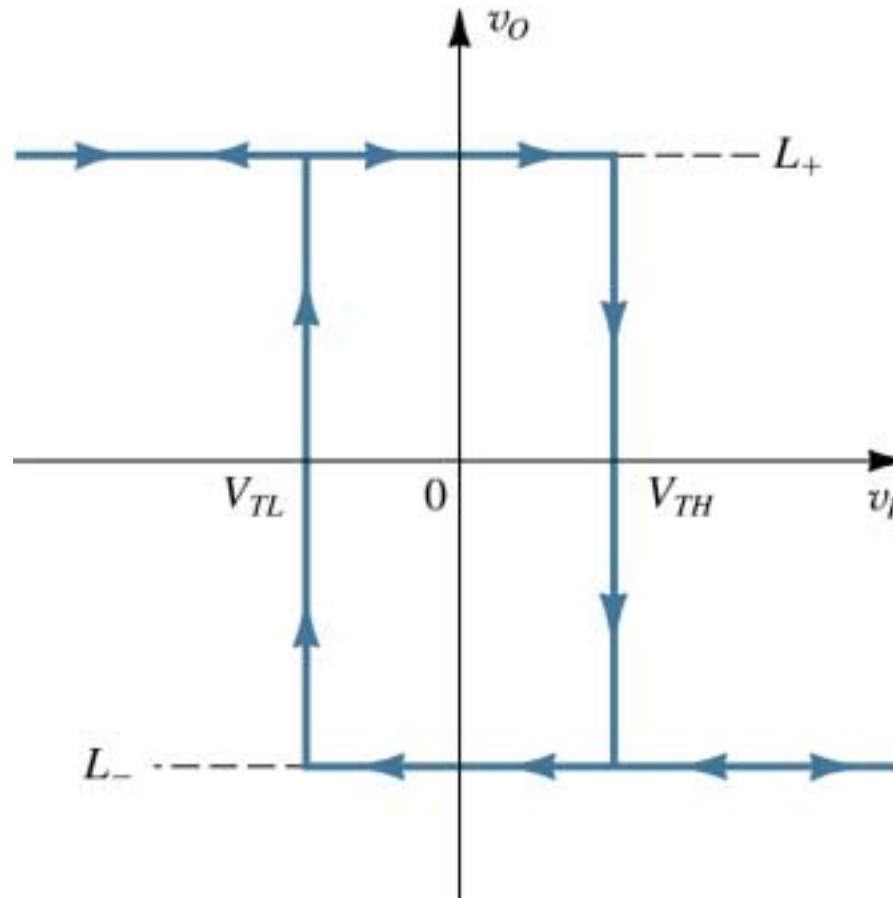Practical implementation of the active-filter tuned oscillator.

The bistable circuit with the negative input terminal of the op amp disconnected from ground and connected to an input signal v_I.
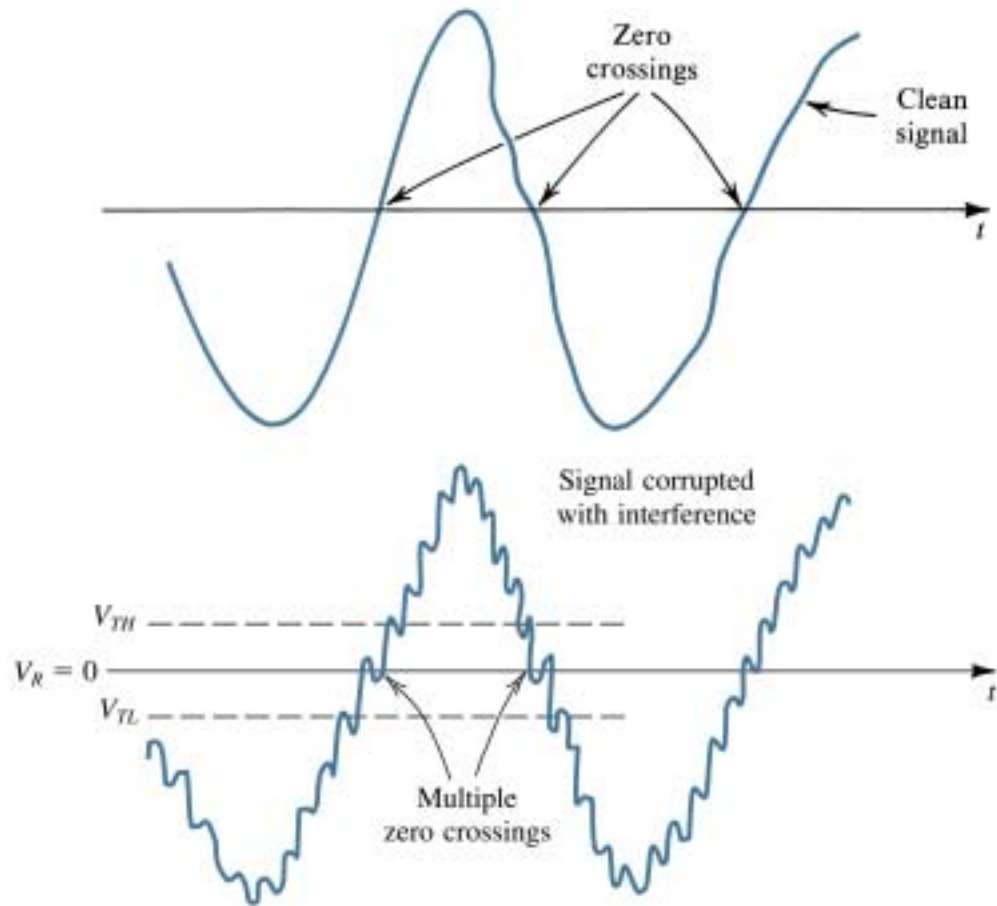
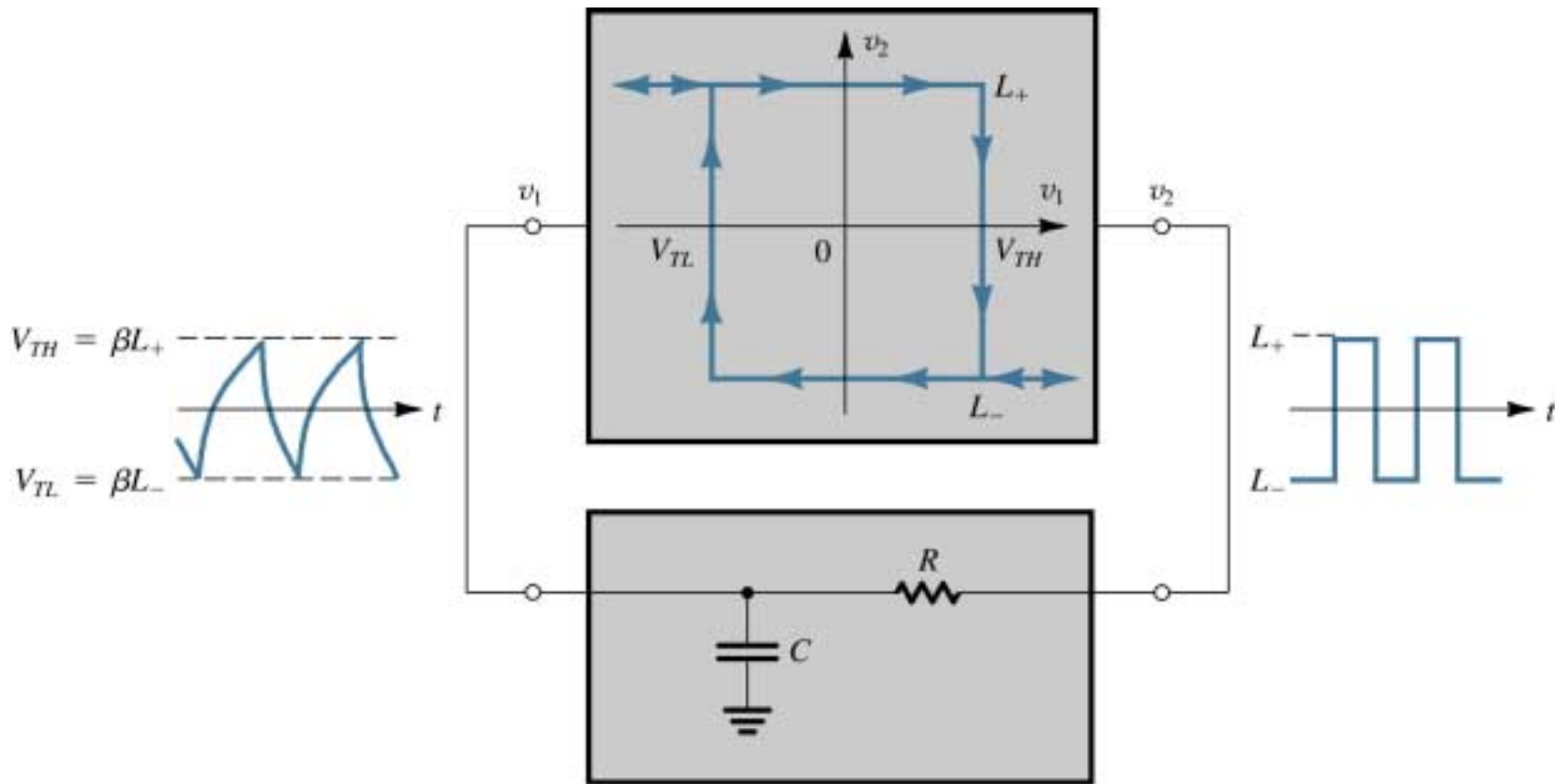The transfer characteristic of the circuit for increasing v_I.

The transfer characteristic for increasing v_I.
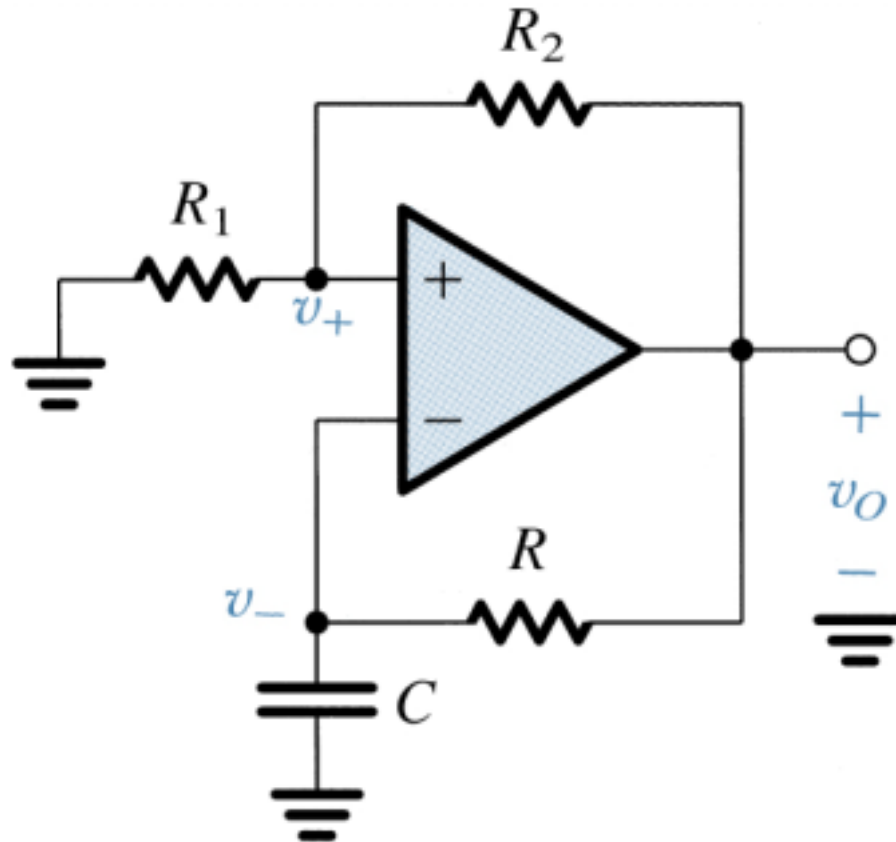
The complete transfer characteristics.

Illustrating the use of hysteresis in the comparator characteristics as a means of rejecting interference.
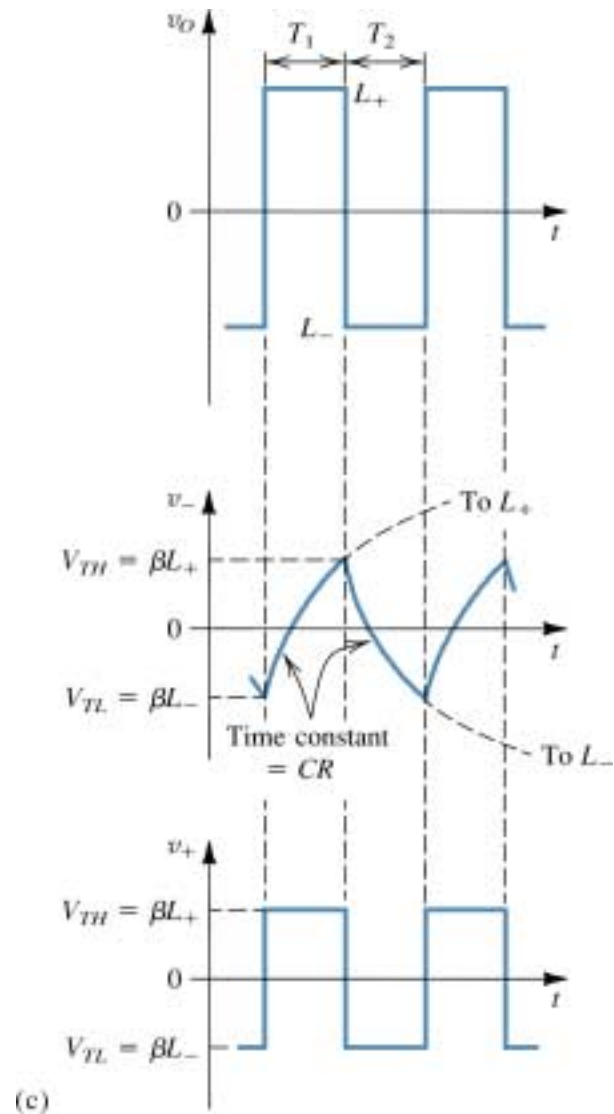
Connecting a bistable multivibrator with inverting transfer characteristic in a feedback loop with an RC circuit results in a square-wave generator.
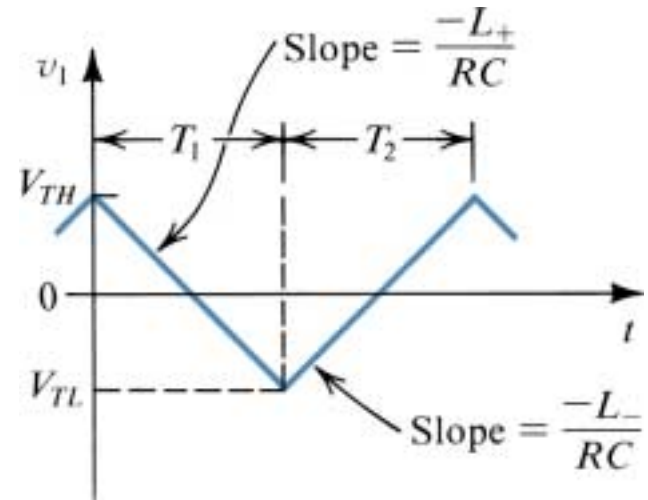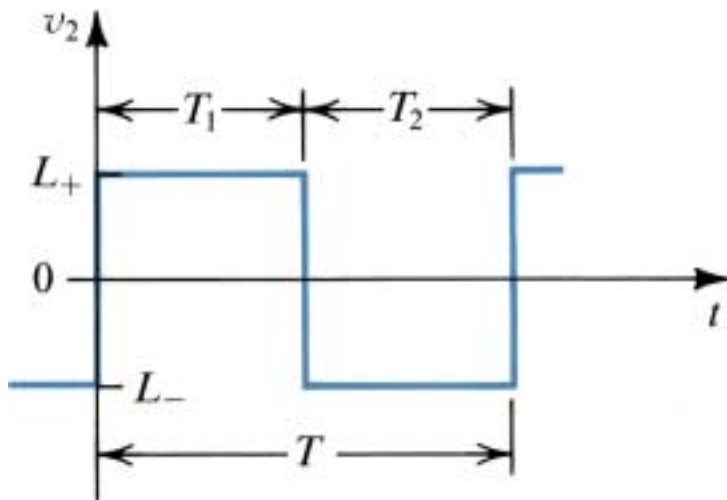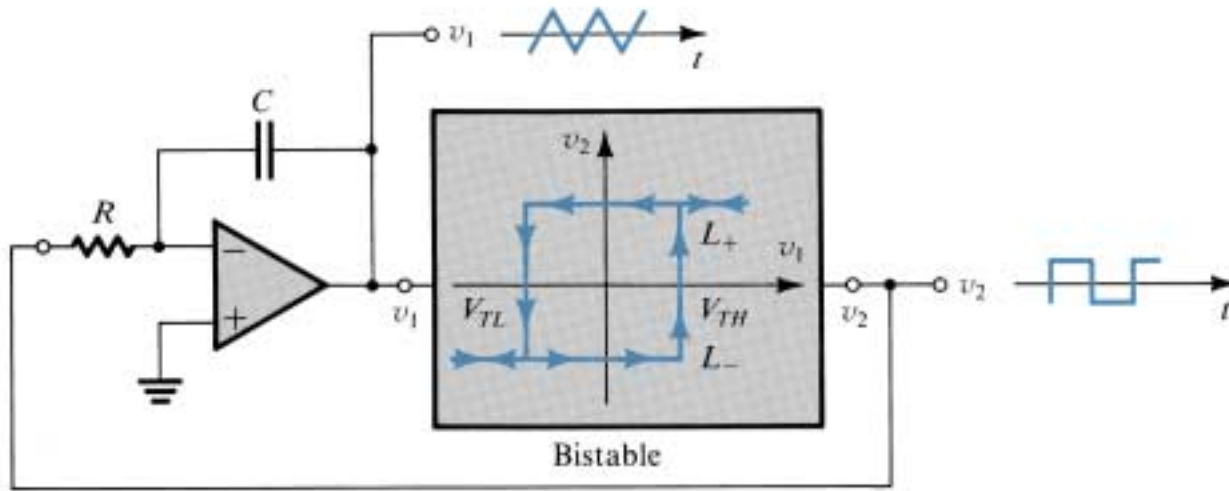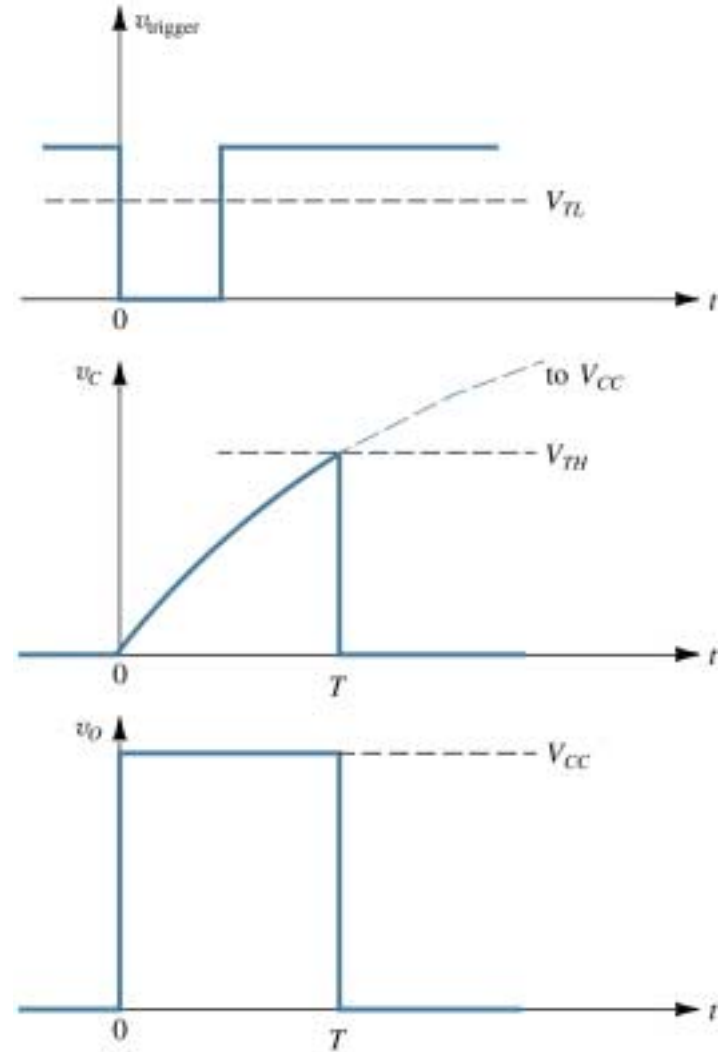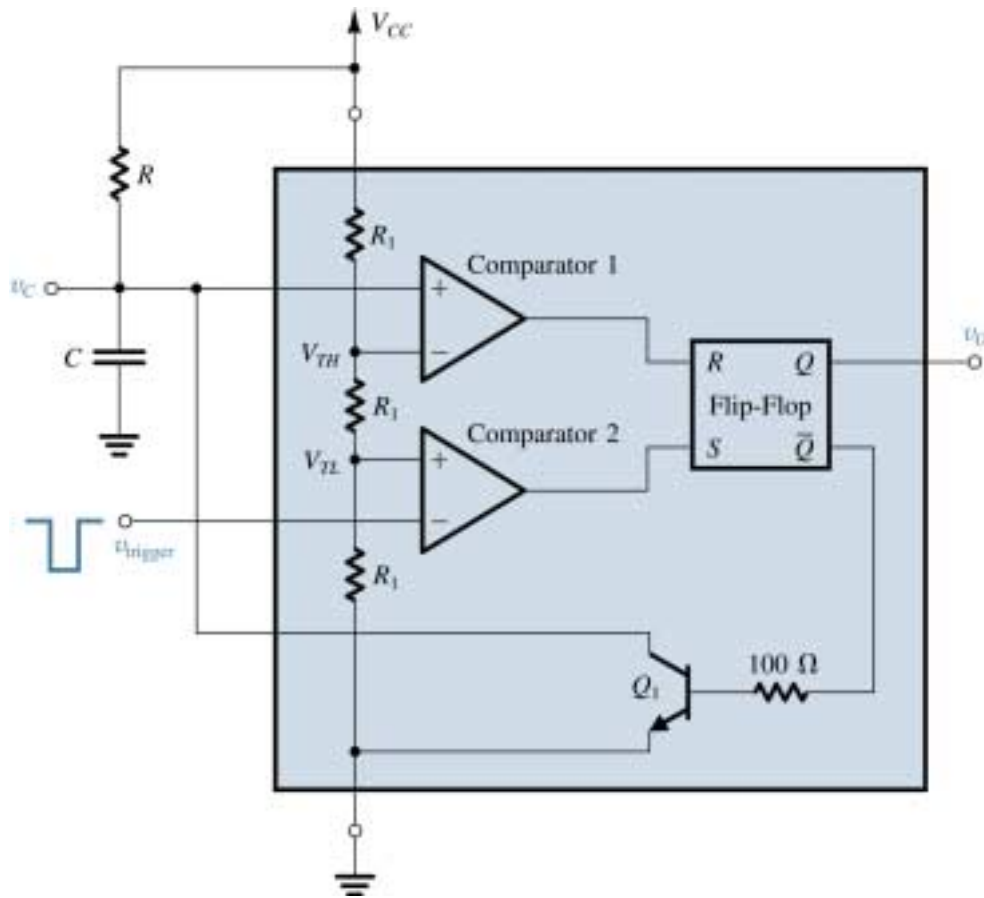
The circuit obtained when the bistable multivibrator is implemented with the previous circuit

(c)

Waveforms at the various nodes of the previous circuit. This circuit is called an astable multivibrator.
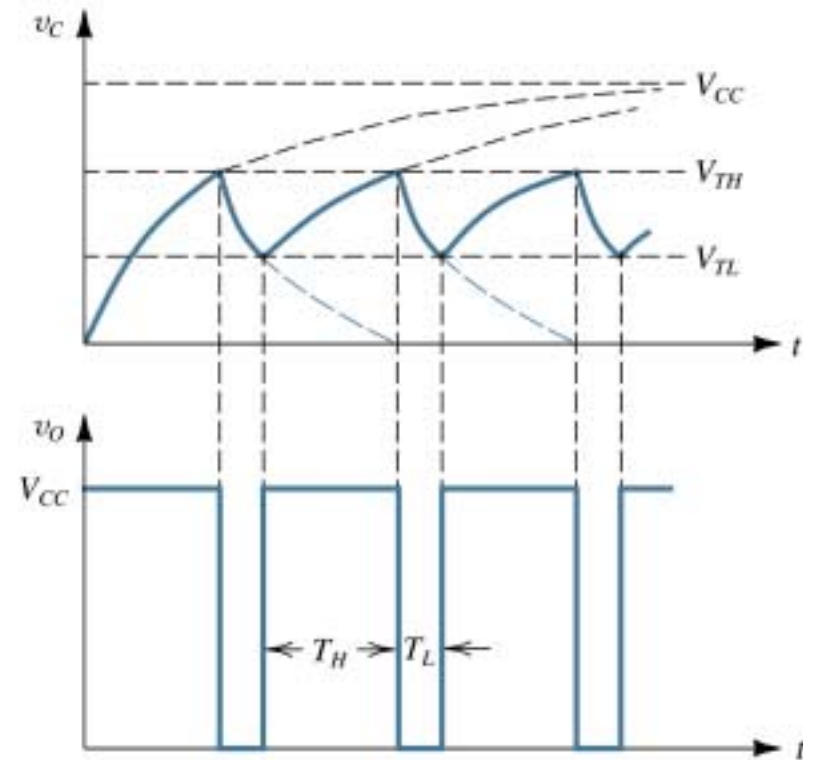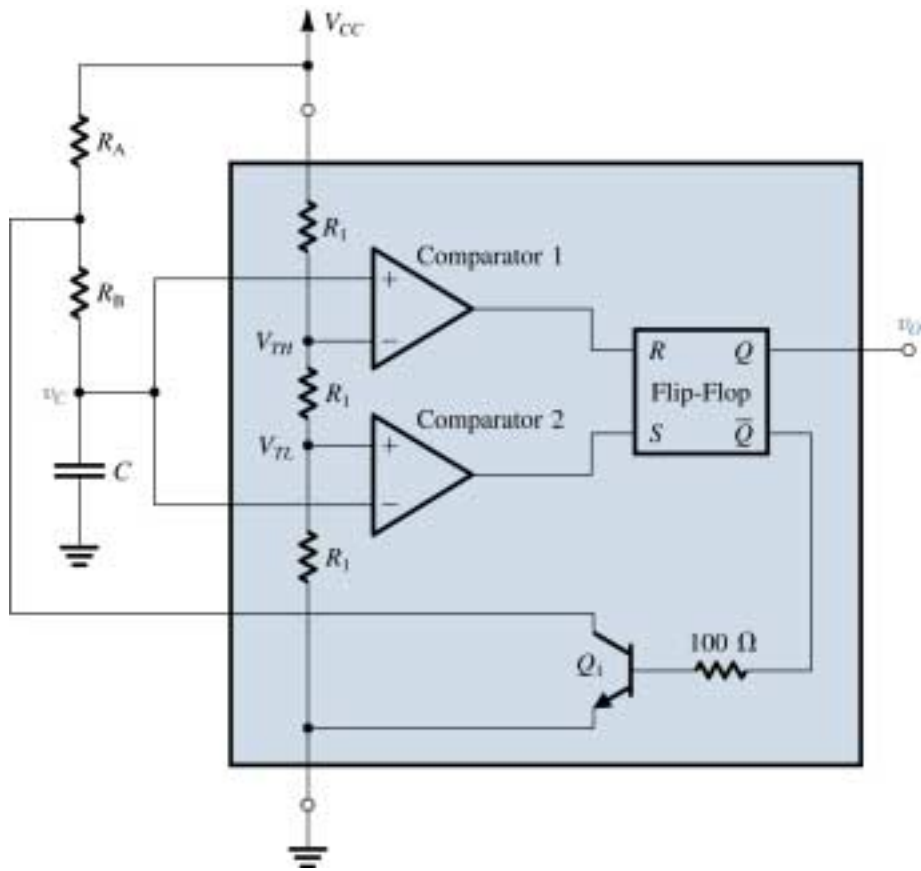
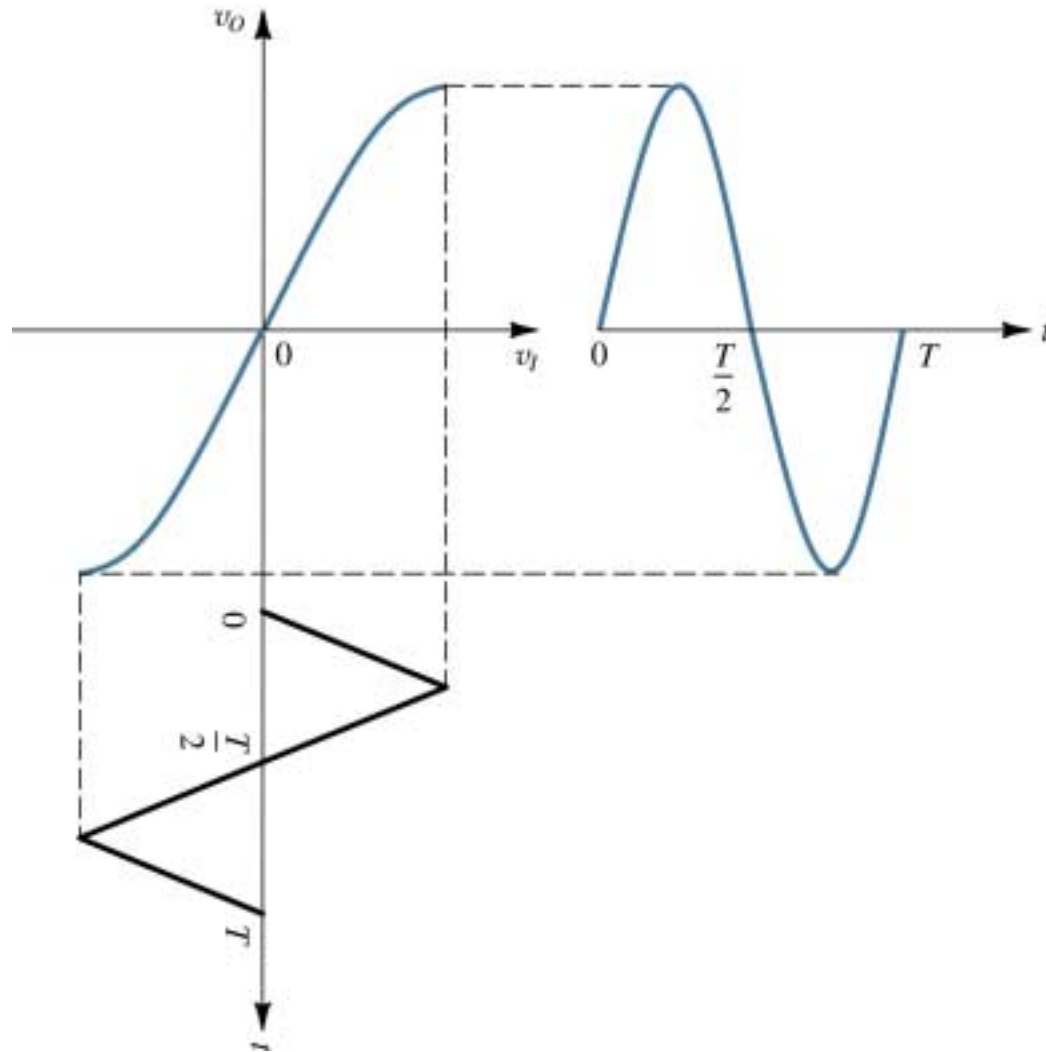General scheme for generating triangular and square waveforms.

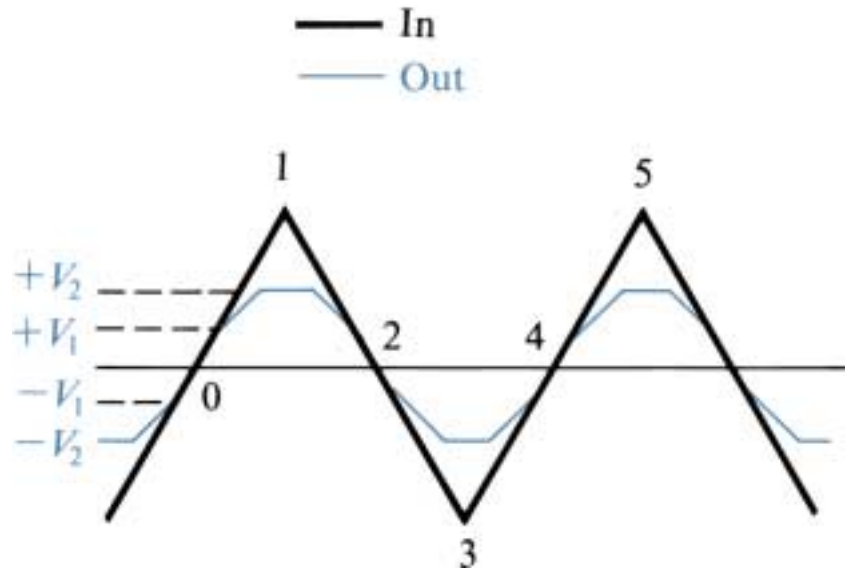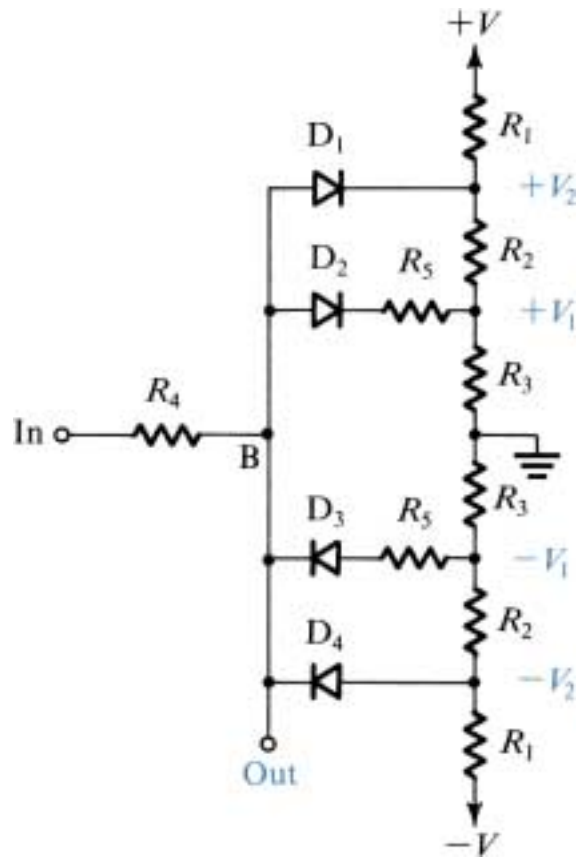The 555 timer connected to implement a monostable multivibrator.

Waveforms of the circuit.

(a) The 555 timer connected to implement an astable multivibrator. **(b)** Waveforms of the circuit in (a).

Using a nonlinear (sinusoidal) transfer characteristic to shape a triangular waveform into a sinusoid.

(a) A three-segment sine-wave shaper. **(b)** the input triangular waveform and the output approximately-sinusoidal waveform.

References

- *Electronics* by A. Hambley
- *Microelectronics Circuits* by Sedra & Smith
- Other books on Electronics