Mysteries of Coupled Multivibrators
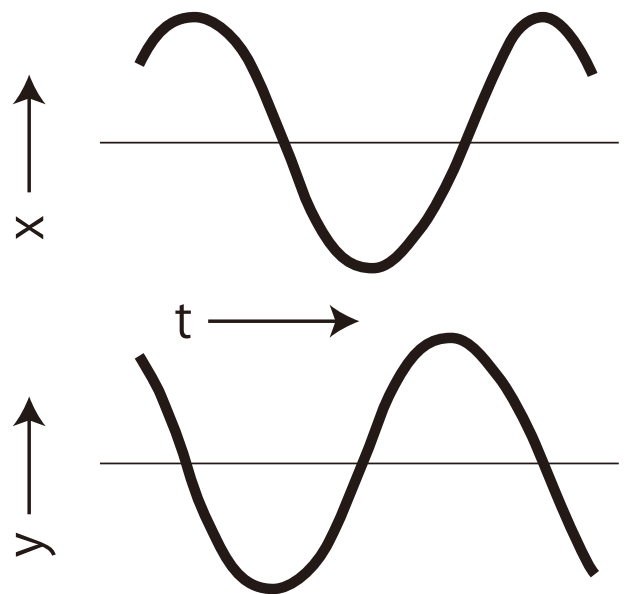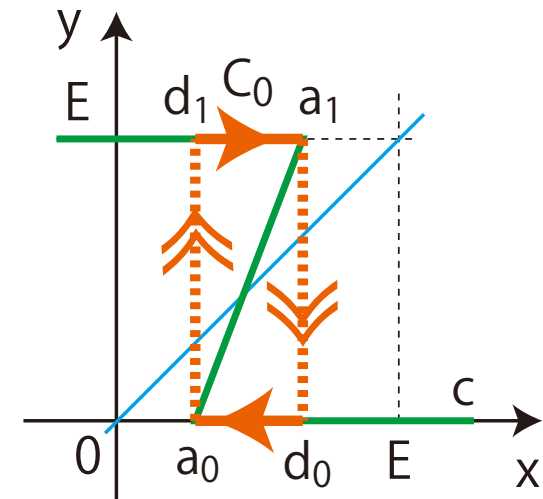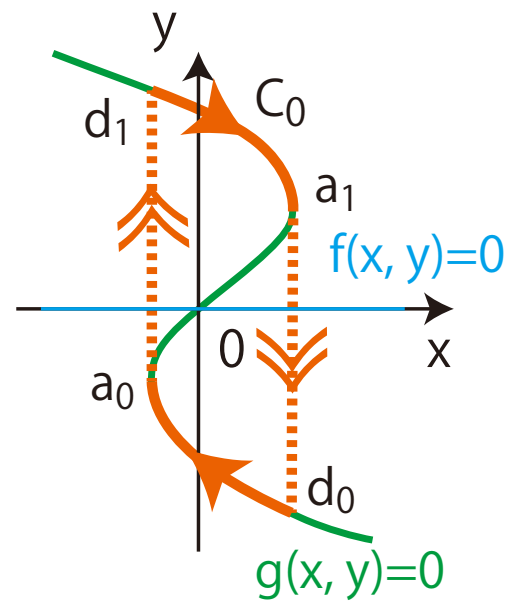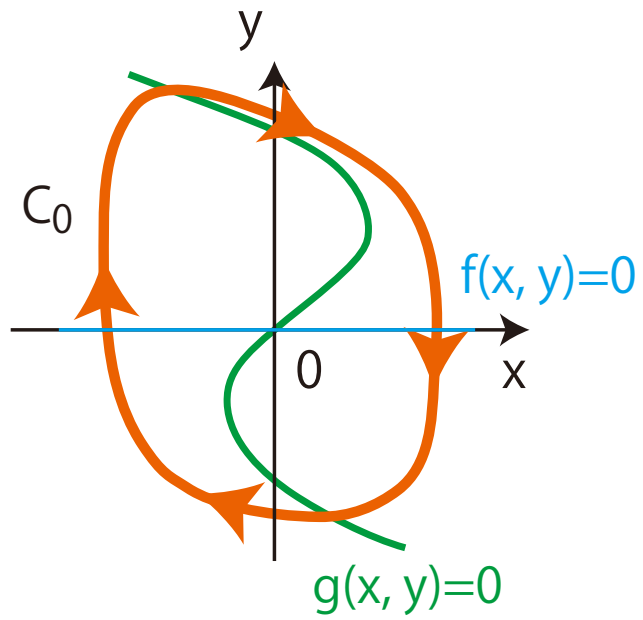
Part I Circuit Examples

http://cms.db.tokushima-u.ac.jp/DAV/person/S10723/NBA2016/
MysteriesOfMV.pdf

H. Kawakami and T. Ueta

2016/12/17

Oscillator

(a)

(b)

(c)
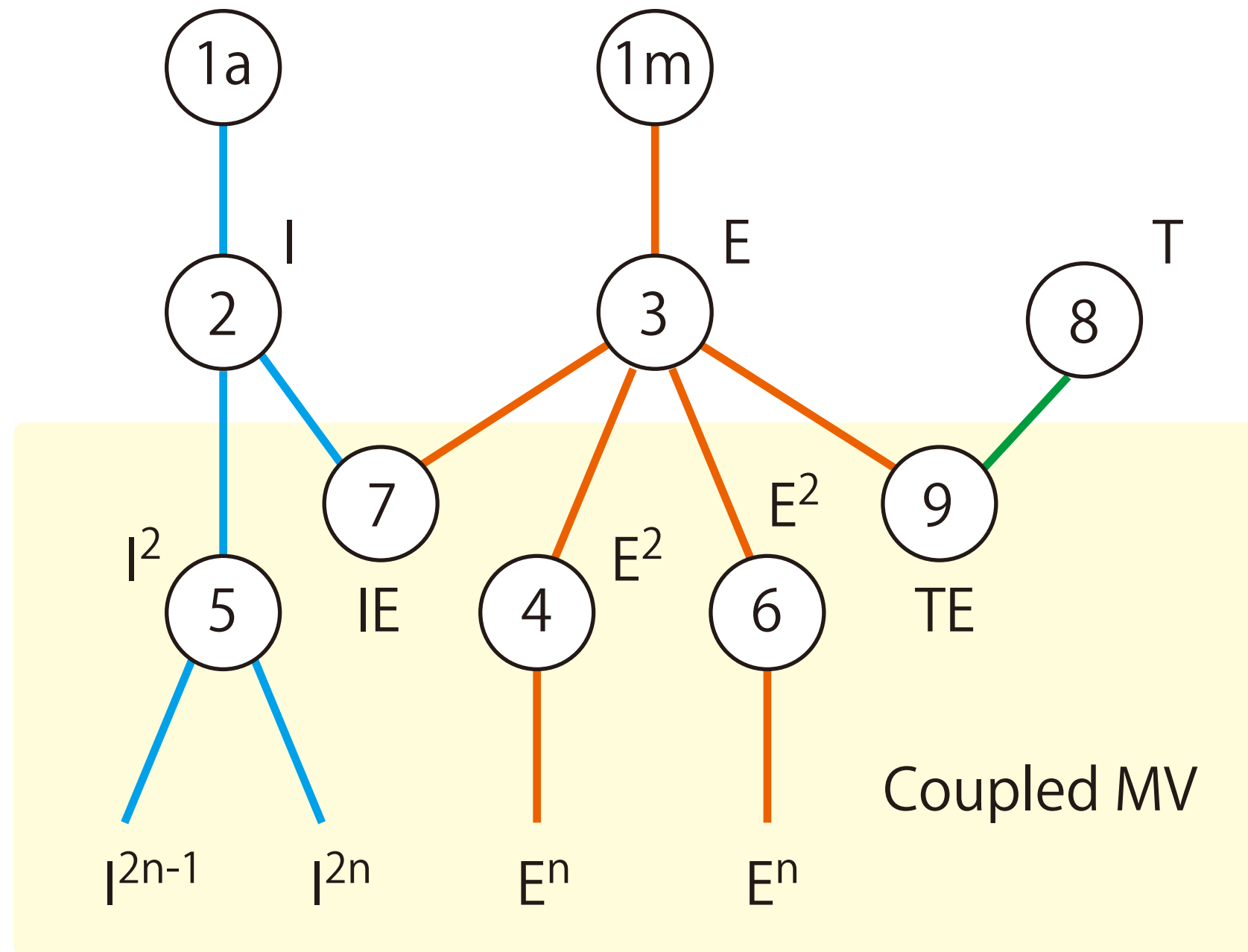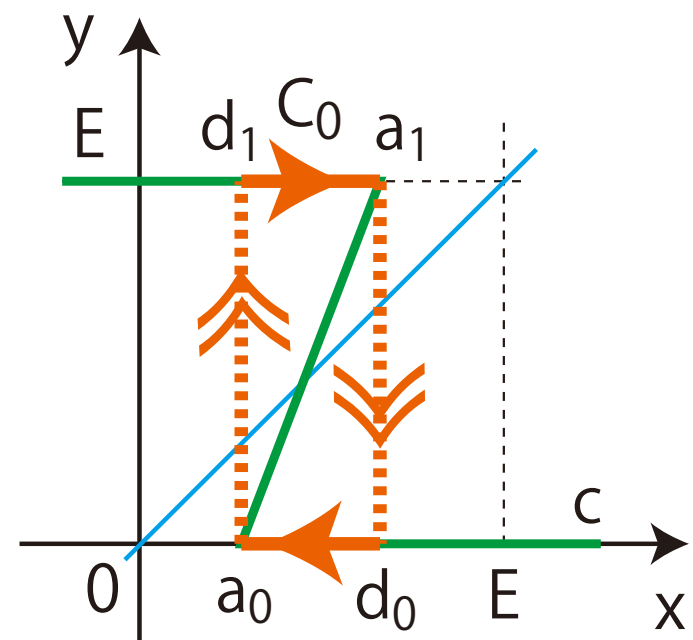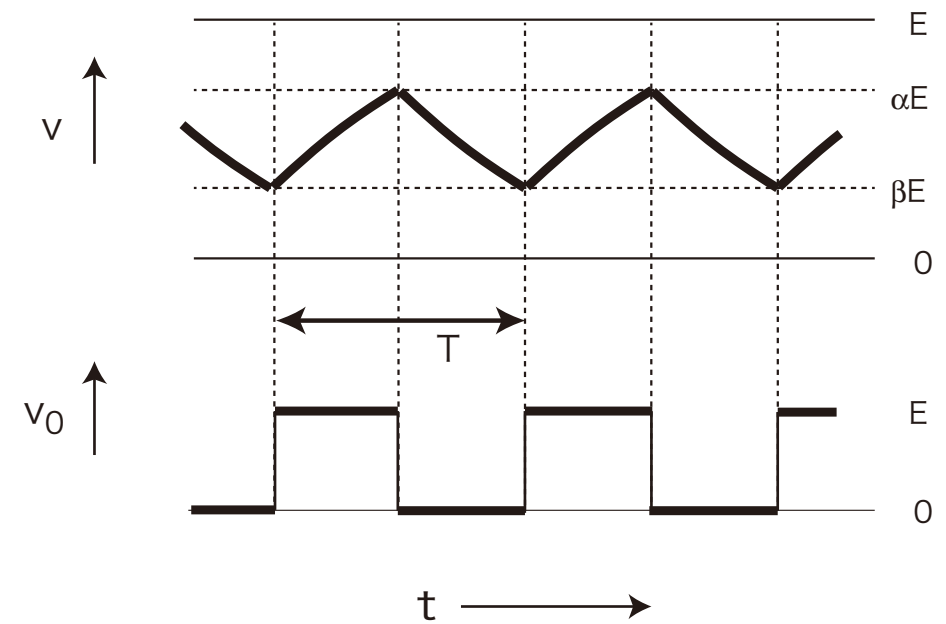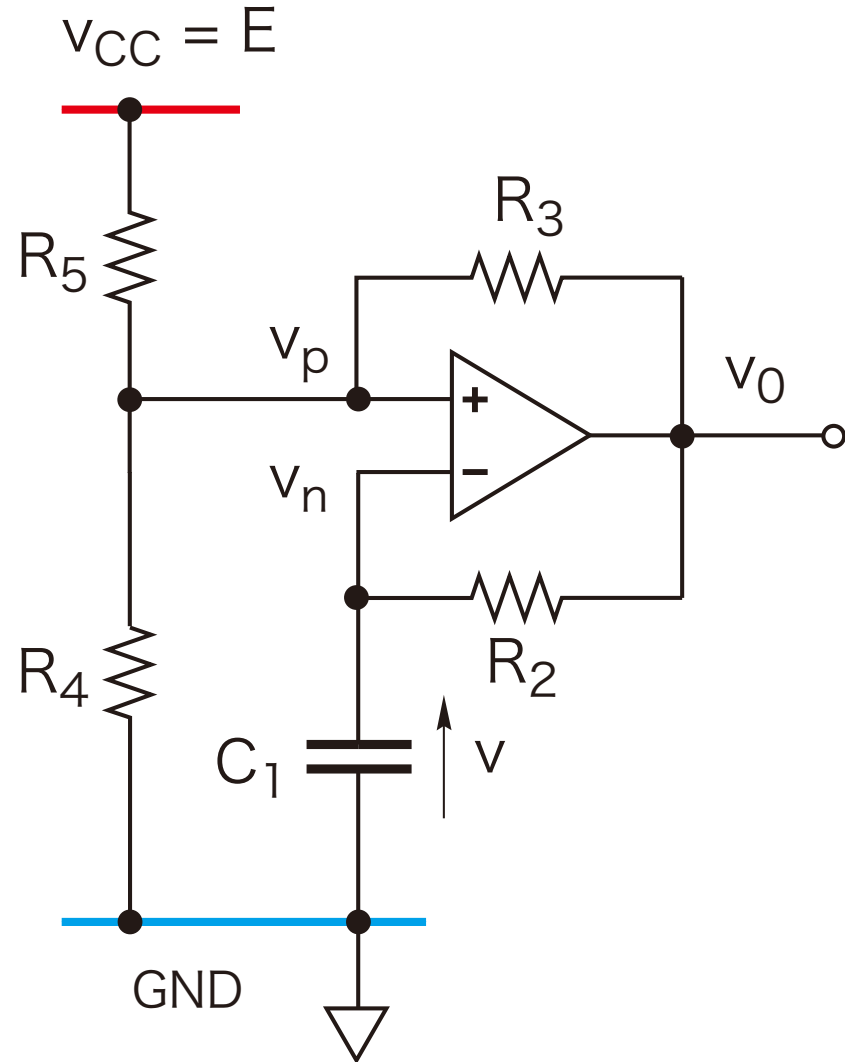
Contents

1. Op amp multivibrators
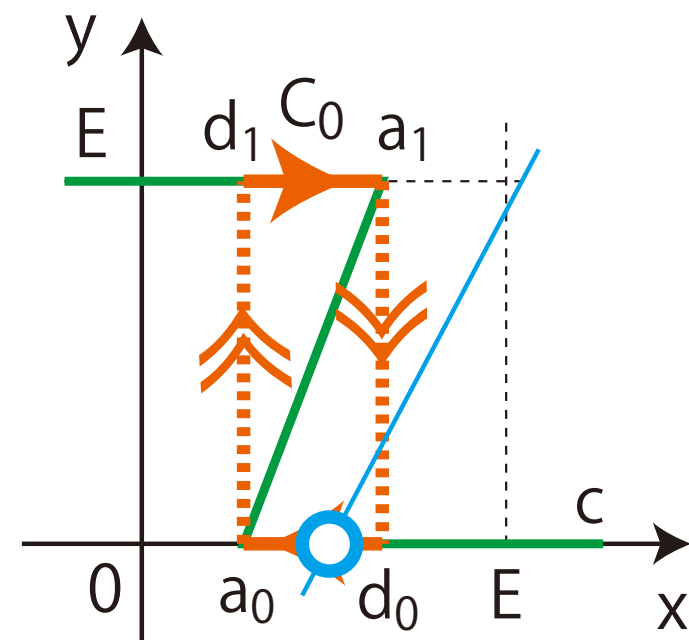
classification of multivibrators

multivibrator 1a
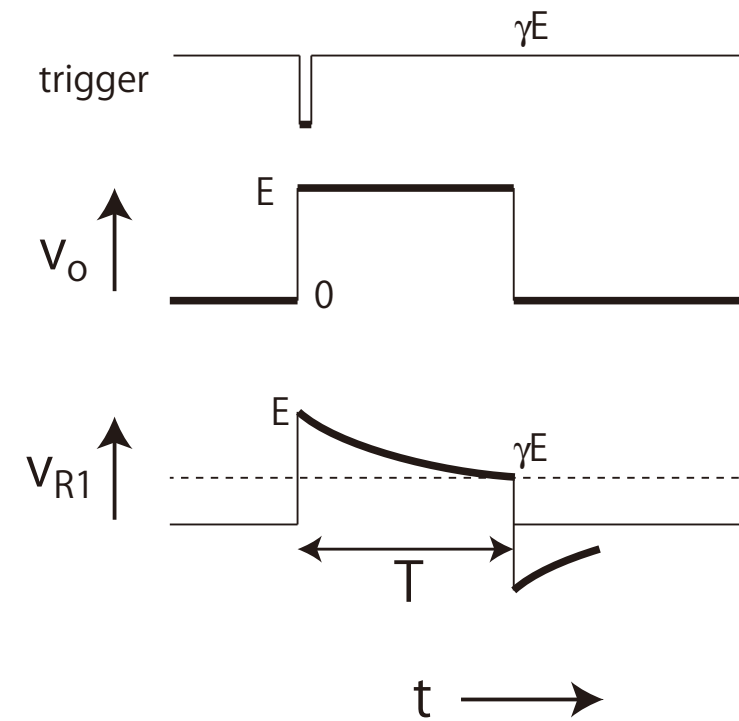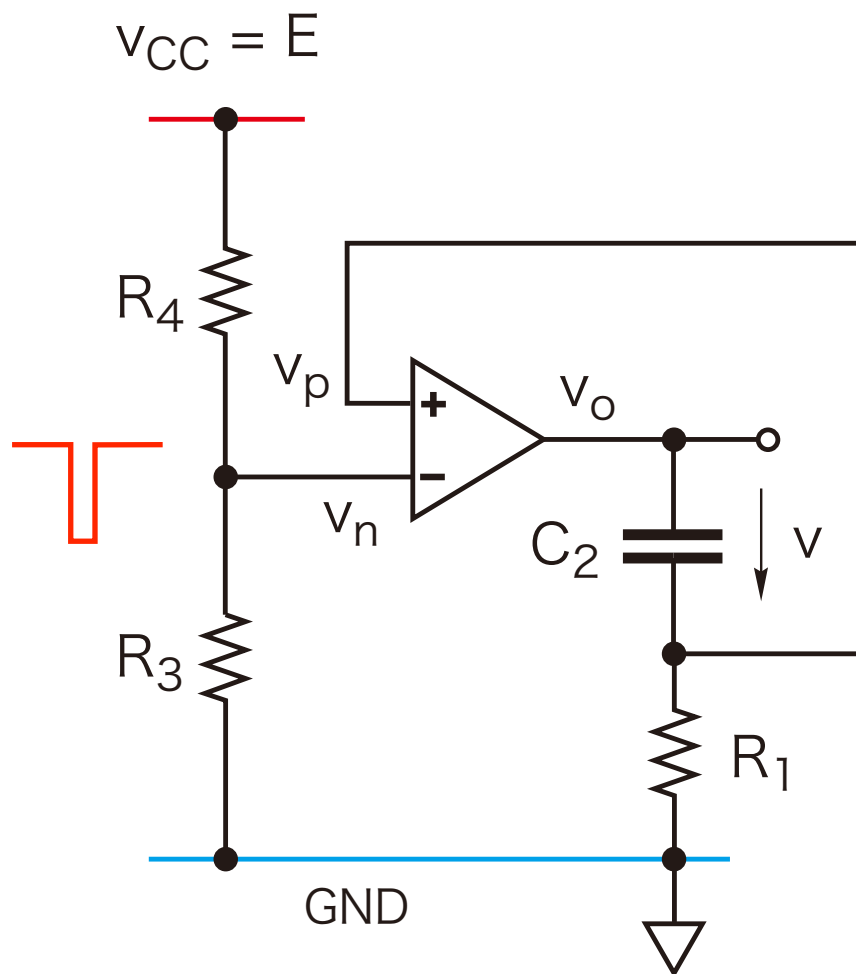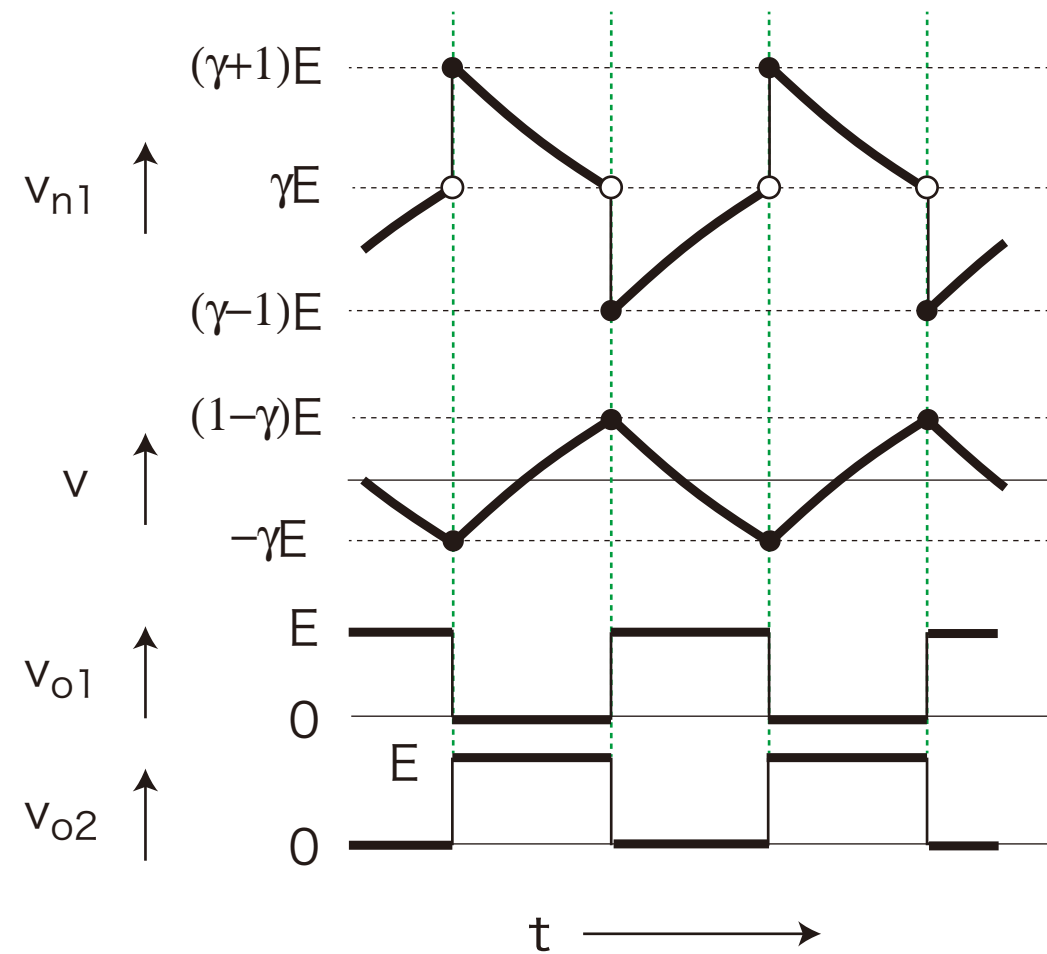
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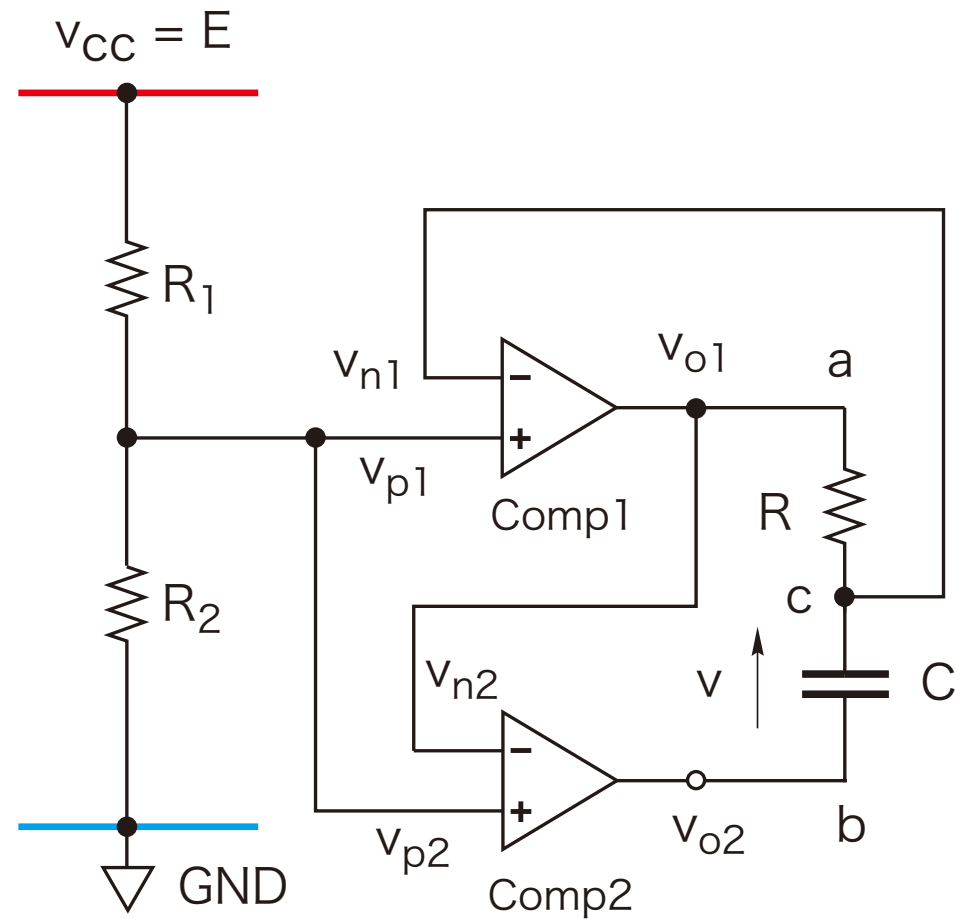
multivibrator (1m)
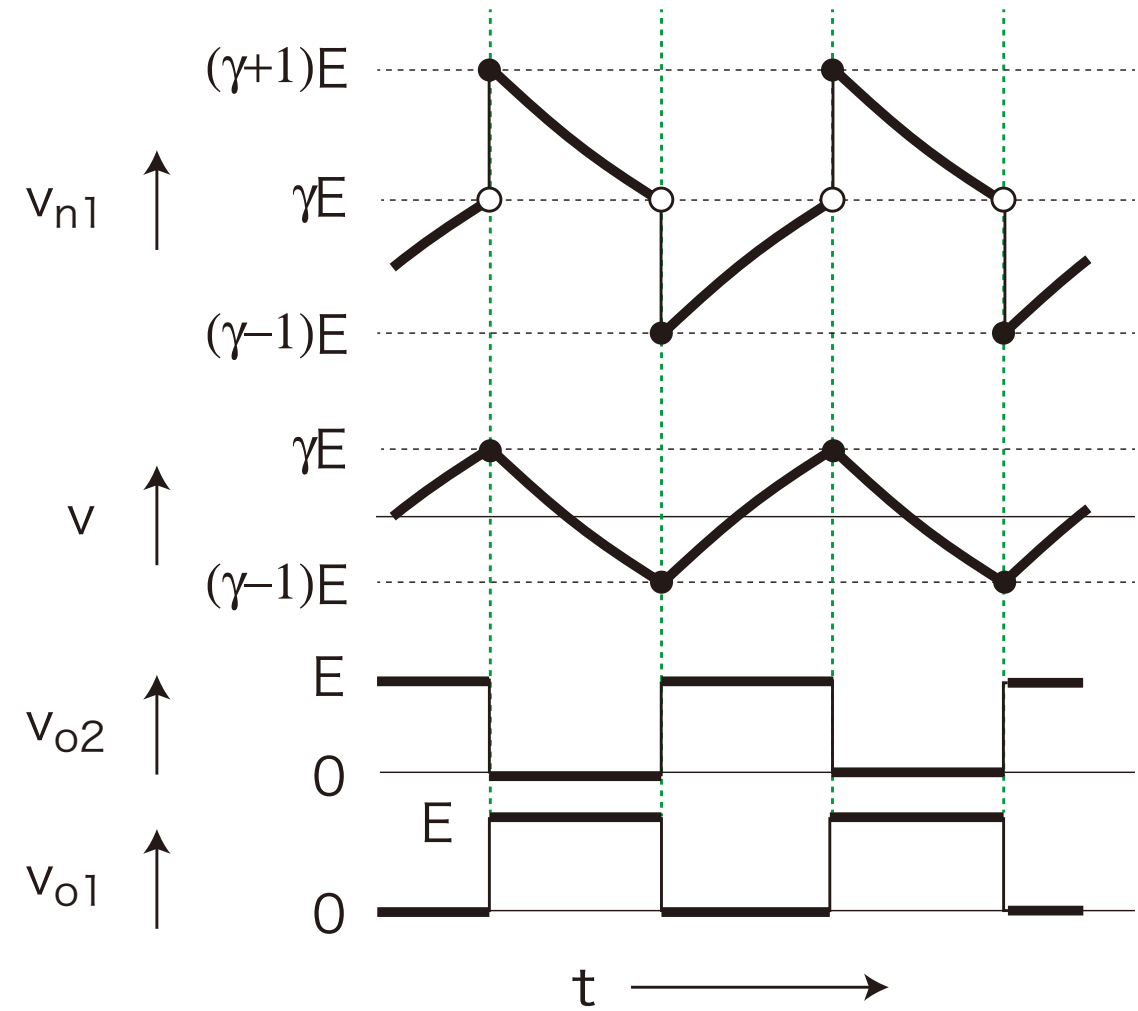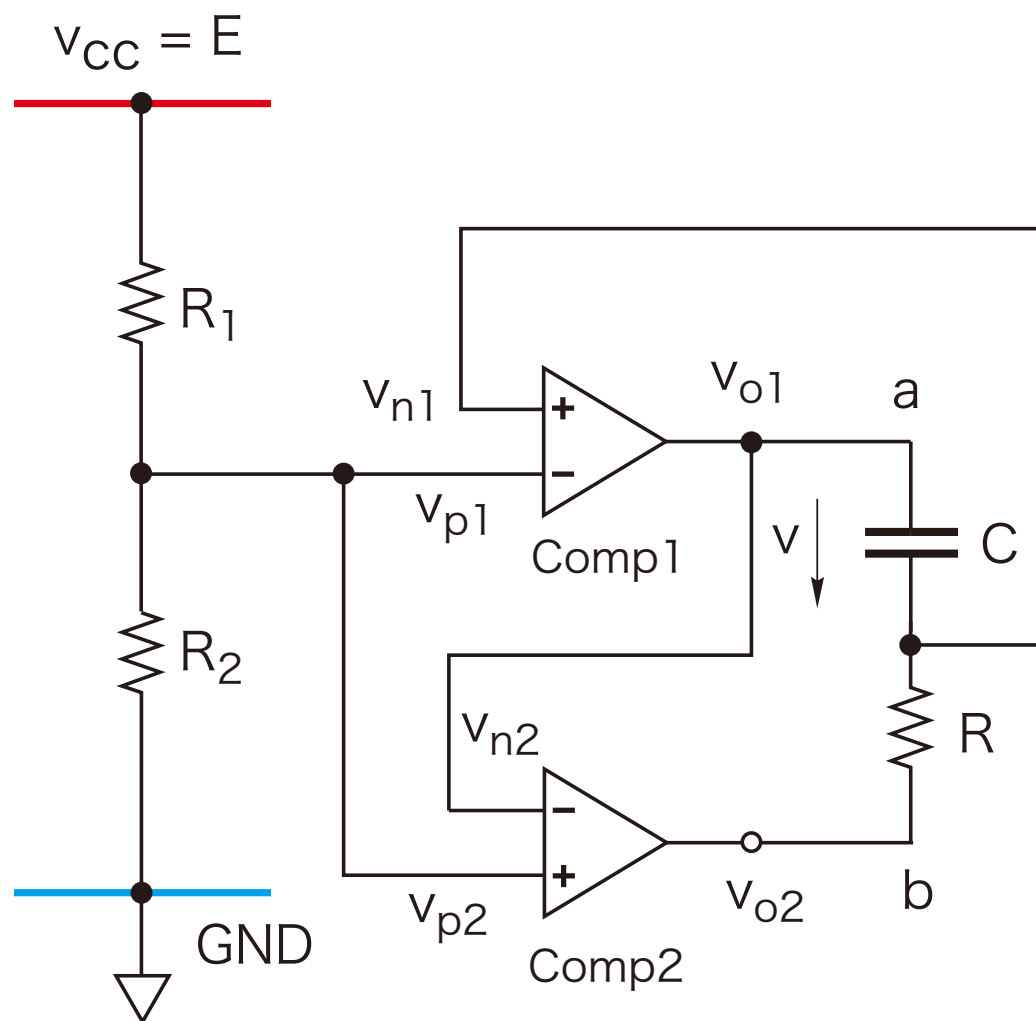
monostable

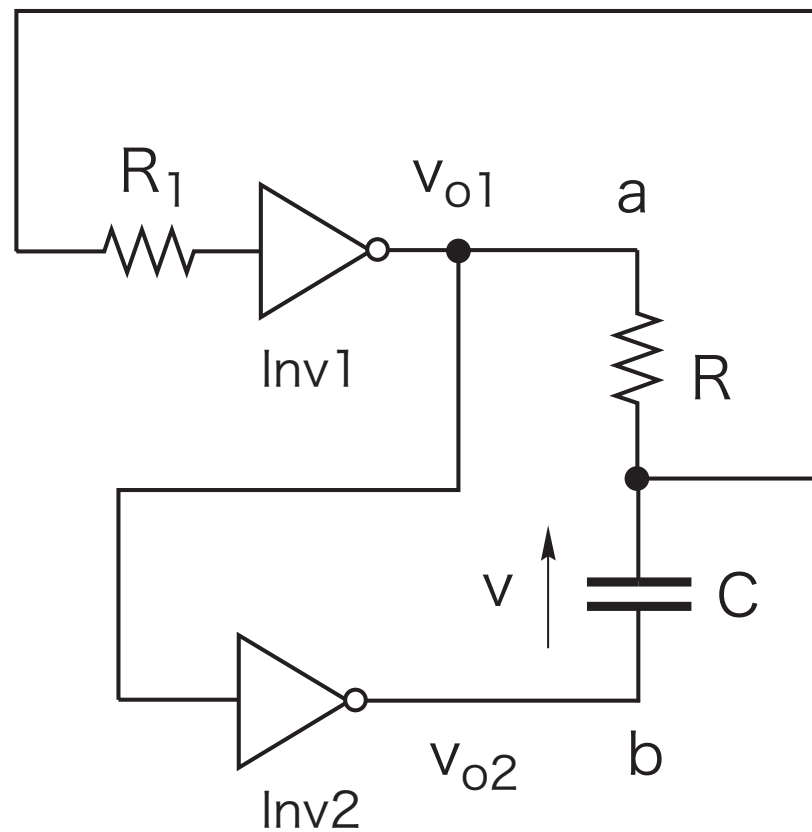# multivibrator ②

astable

multivibrator ③

astable

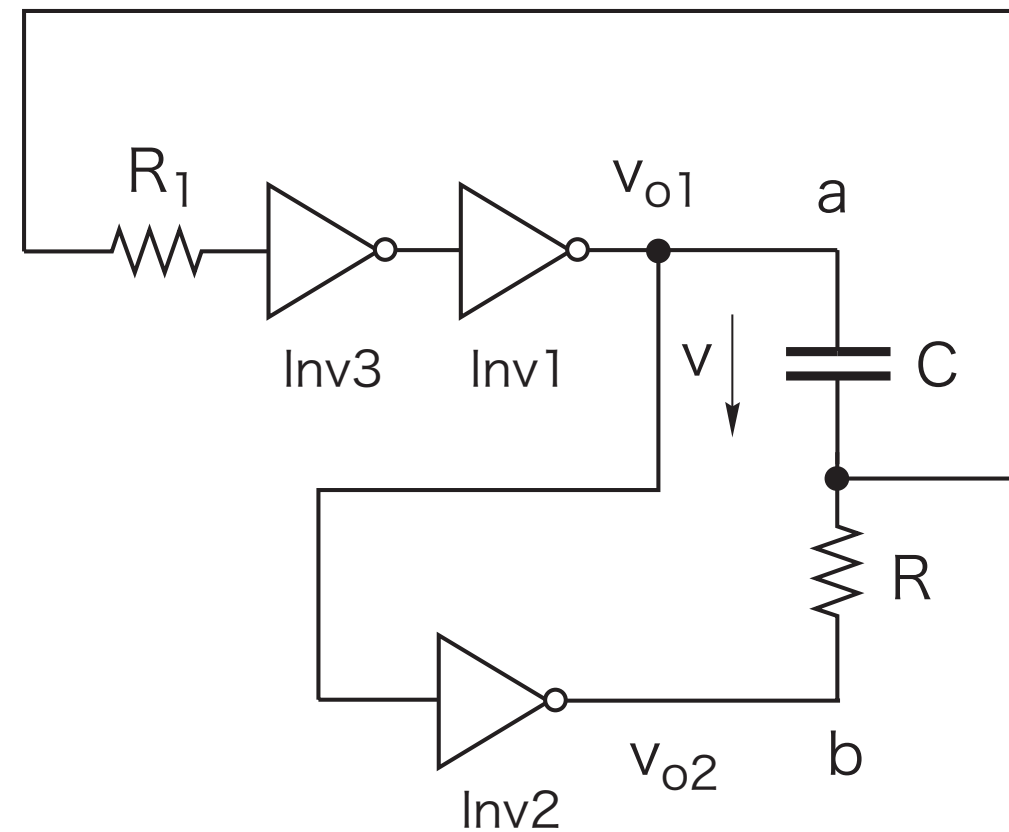# Square wave oscillators

inhibitory neuron ②
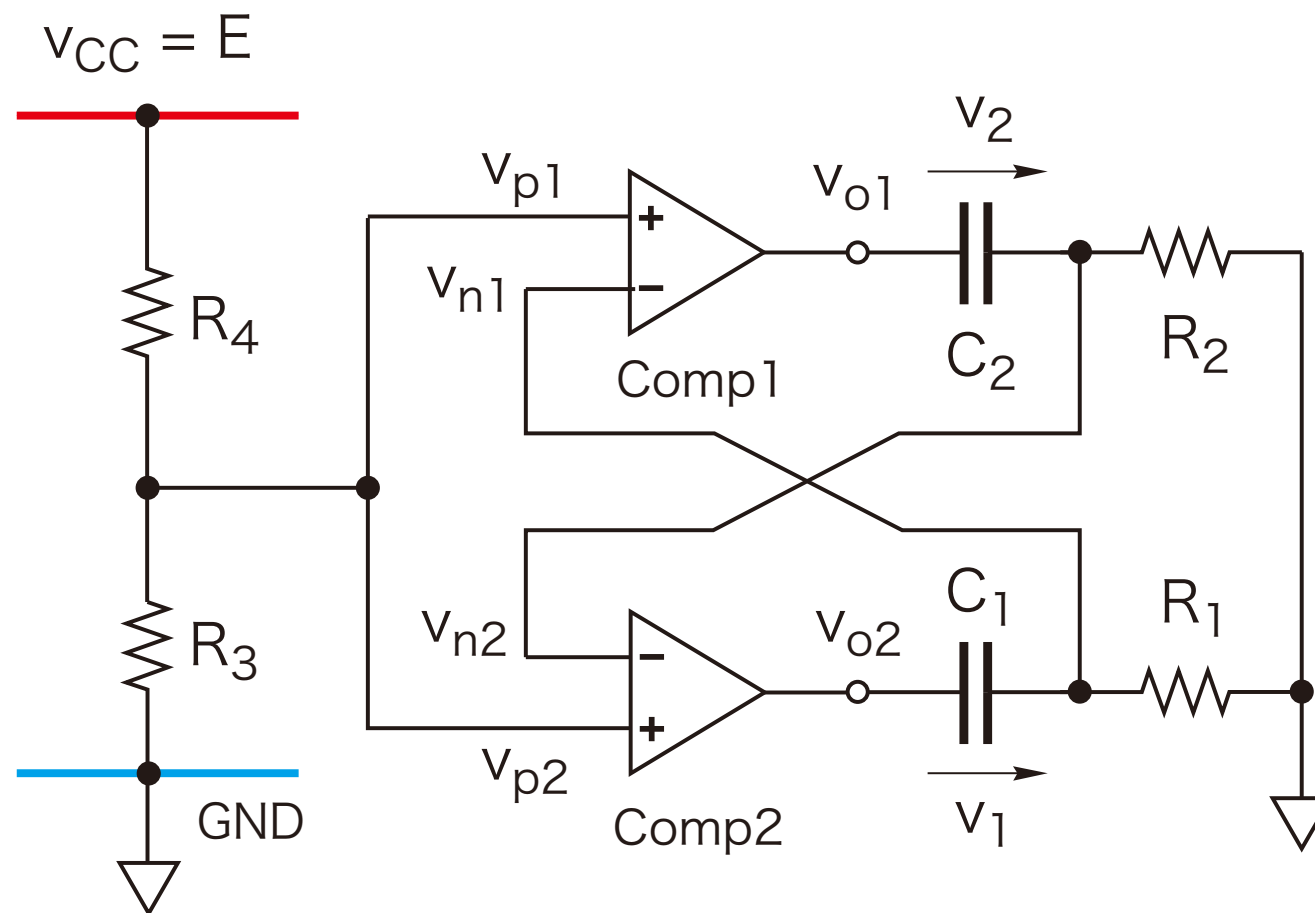
excitatory neuron ③
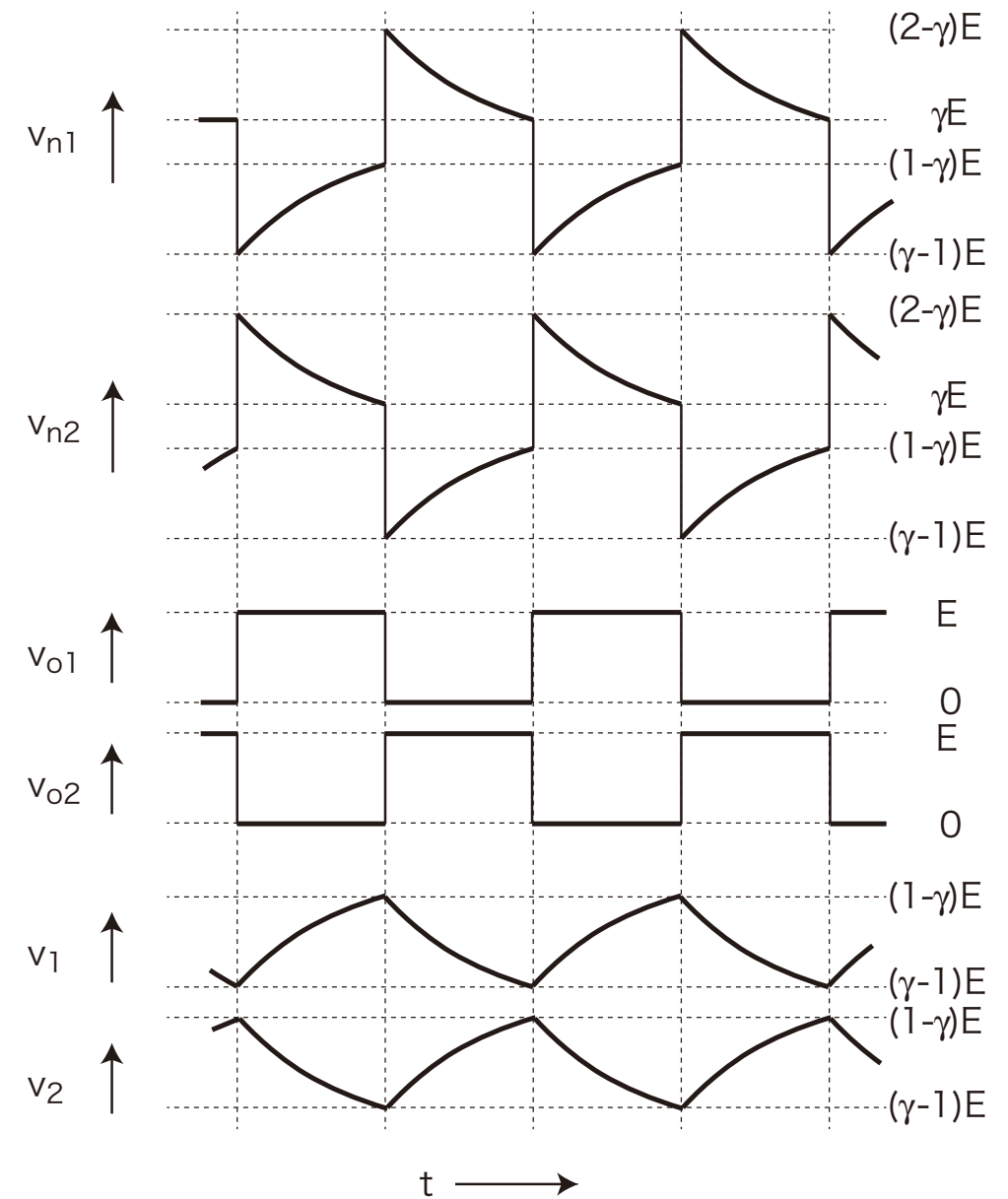

(a)

(b)

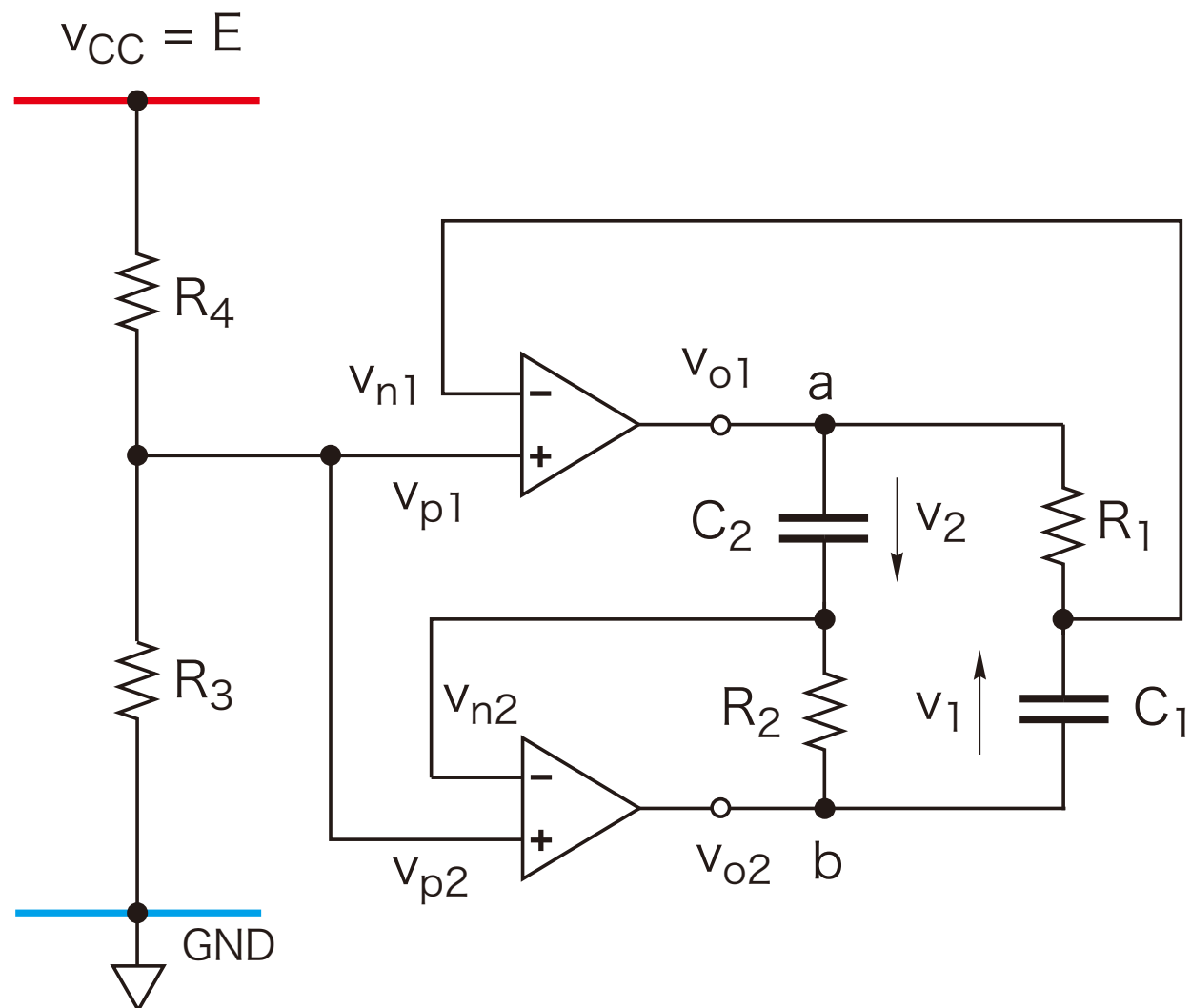# multivibrator ④

astable : anti-phase
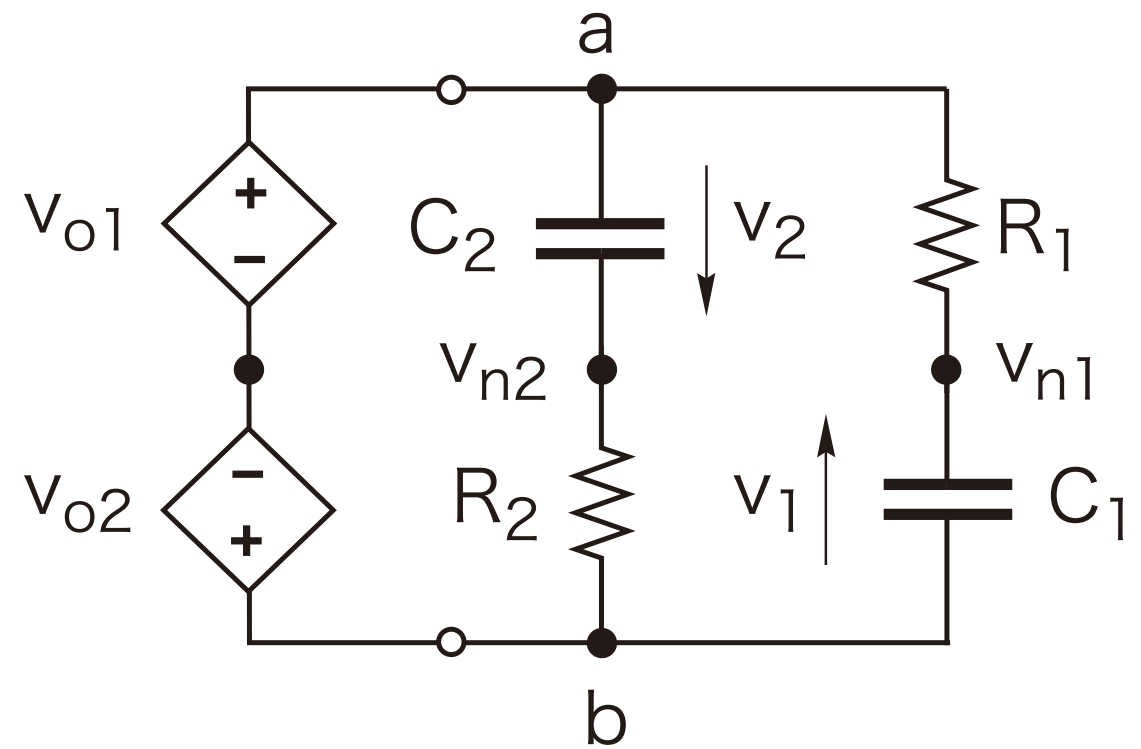
multivibrator ⑤

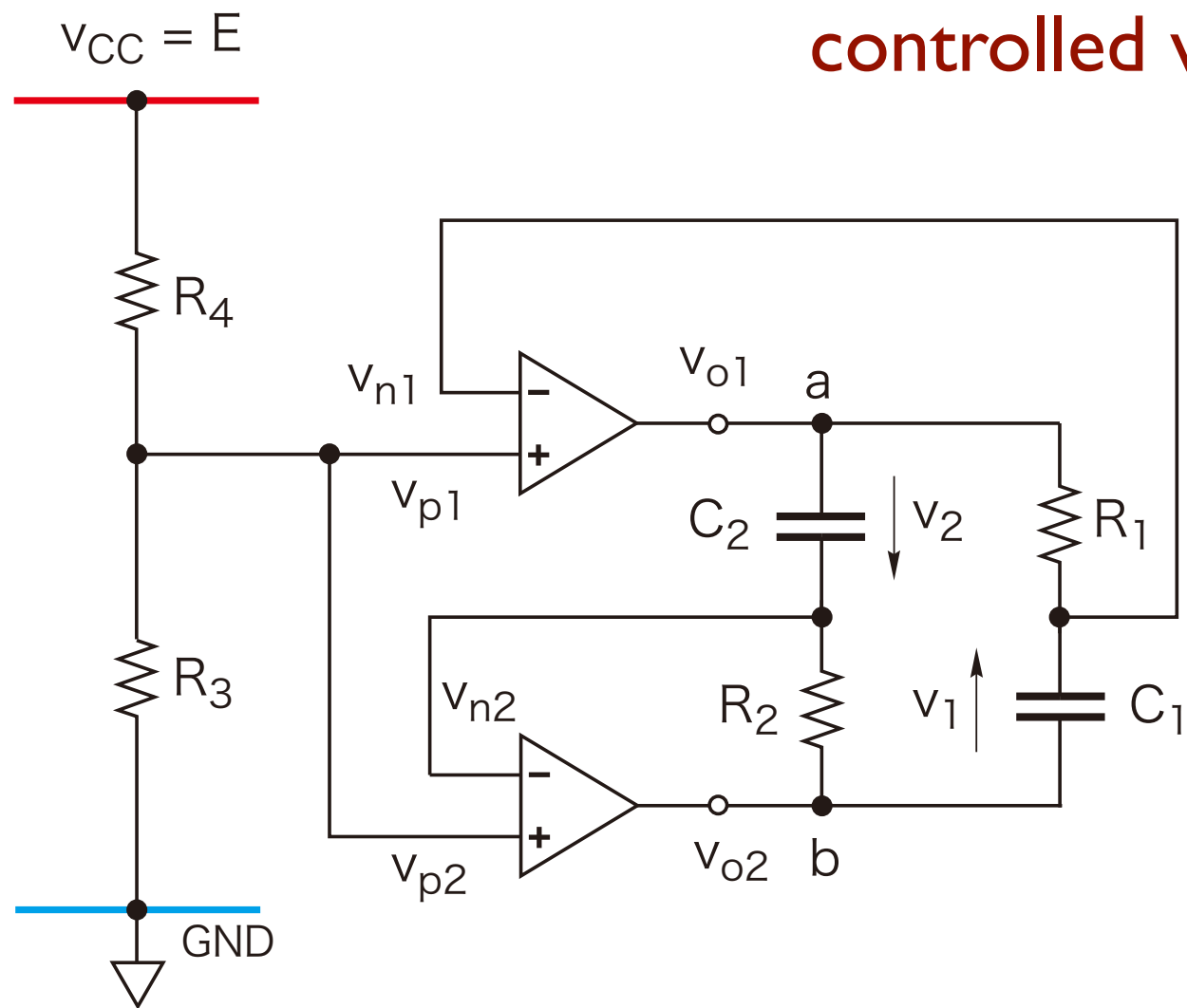## astable : anti-phase

multivibrator ⑤

astable : anti-phase

a linear RC circuit with voltage-controlled voltage sources
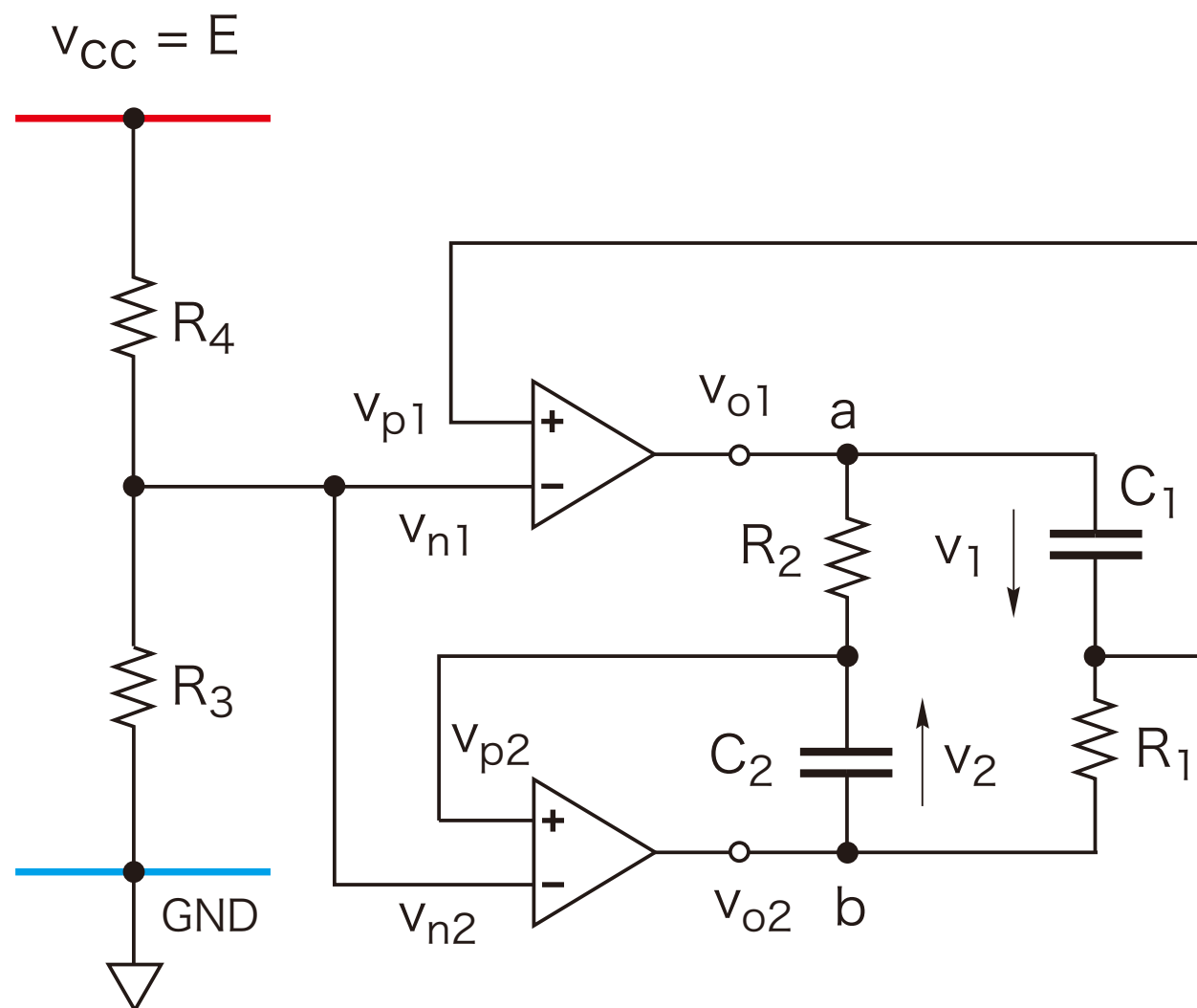

$$v_{o1} = (v_{d1} > 0)?E : 0$$
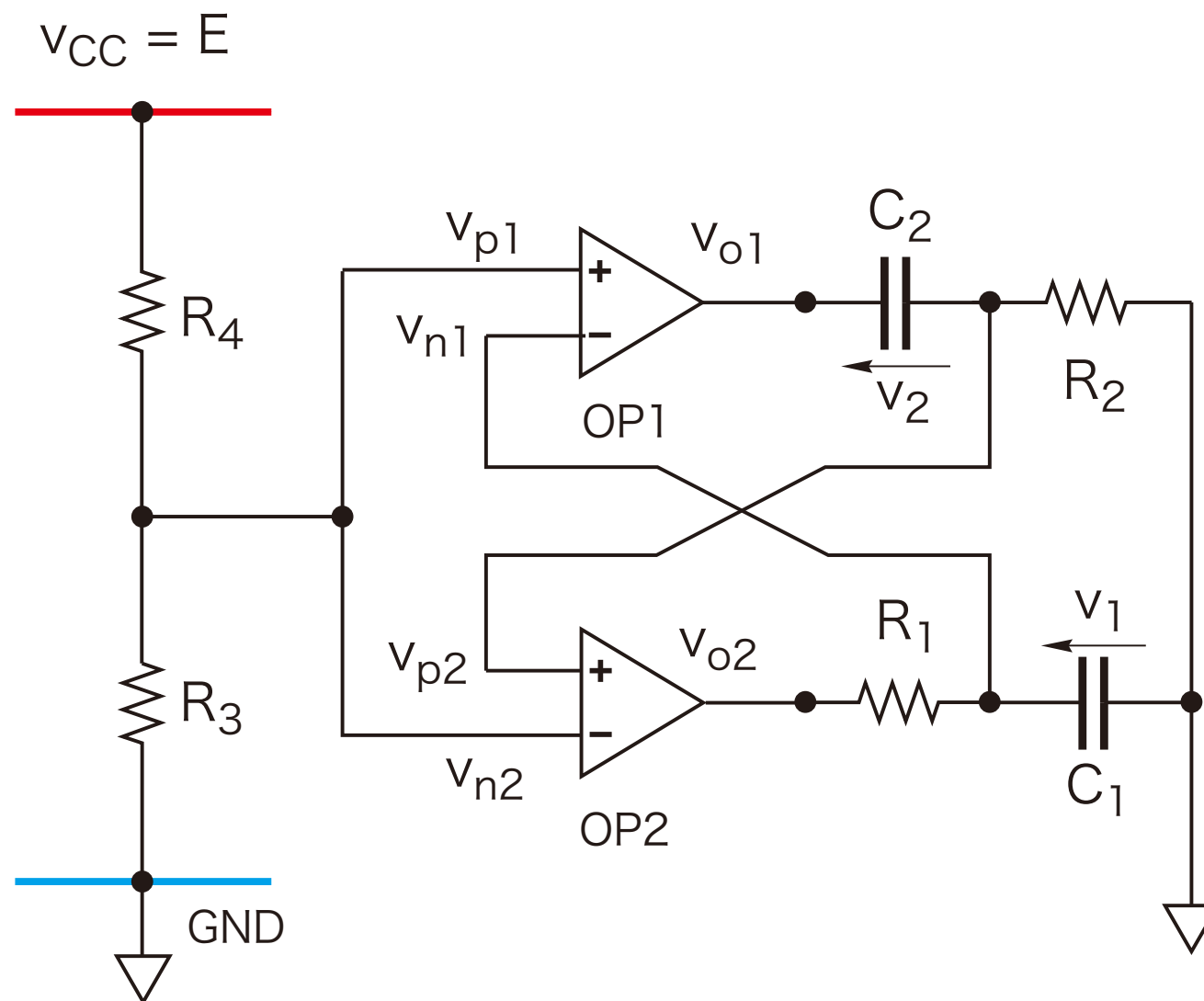
$$v_{o2} = (v_{d2} > 0)?E : 0$$

multivibrator ⑥

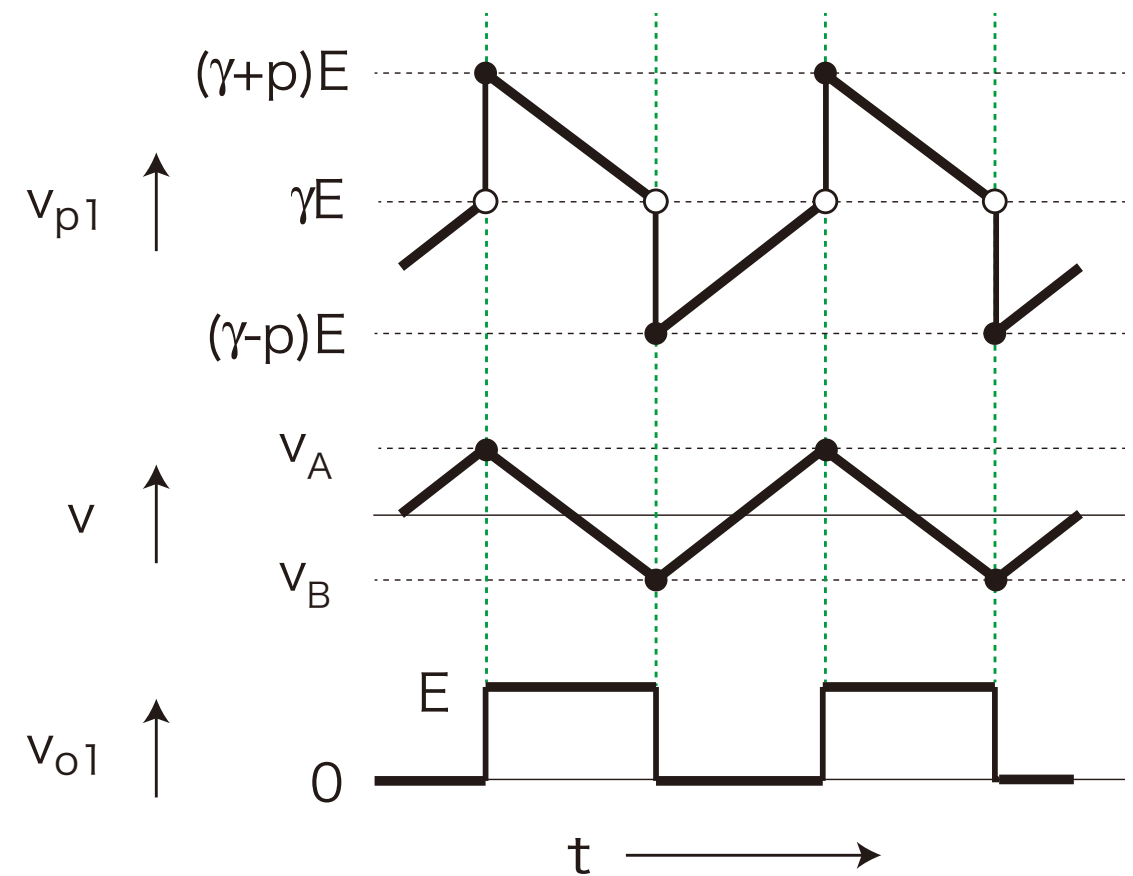tri-stable : (0, 0), (E, E), anti-phase

multivibrator ⑦
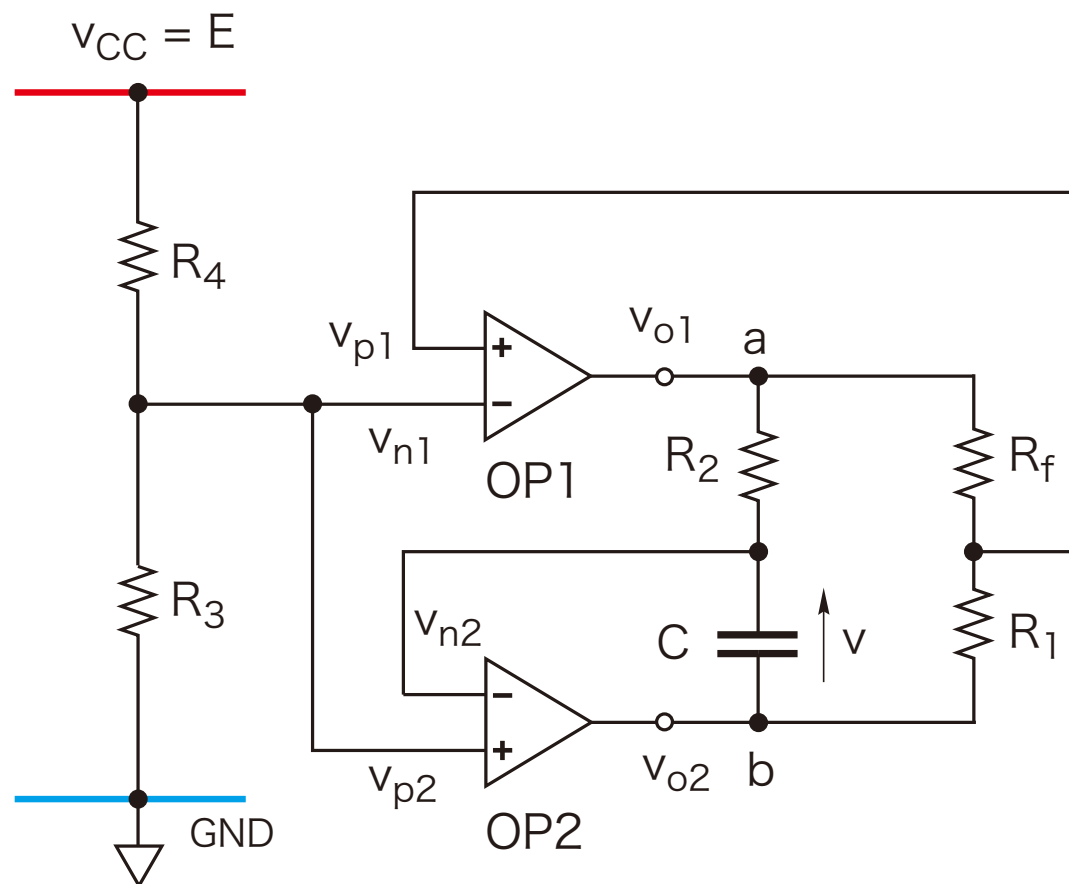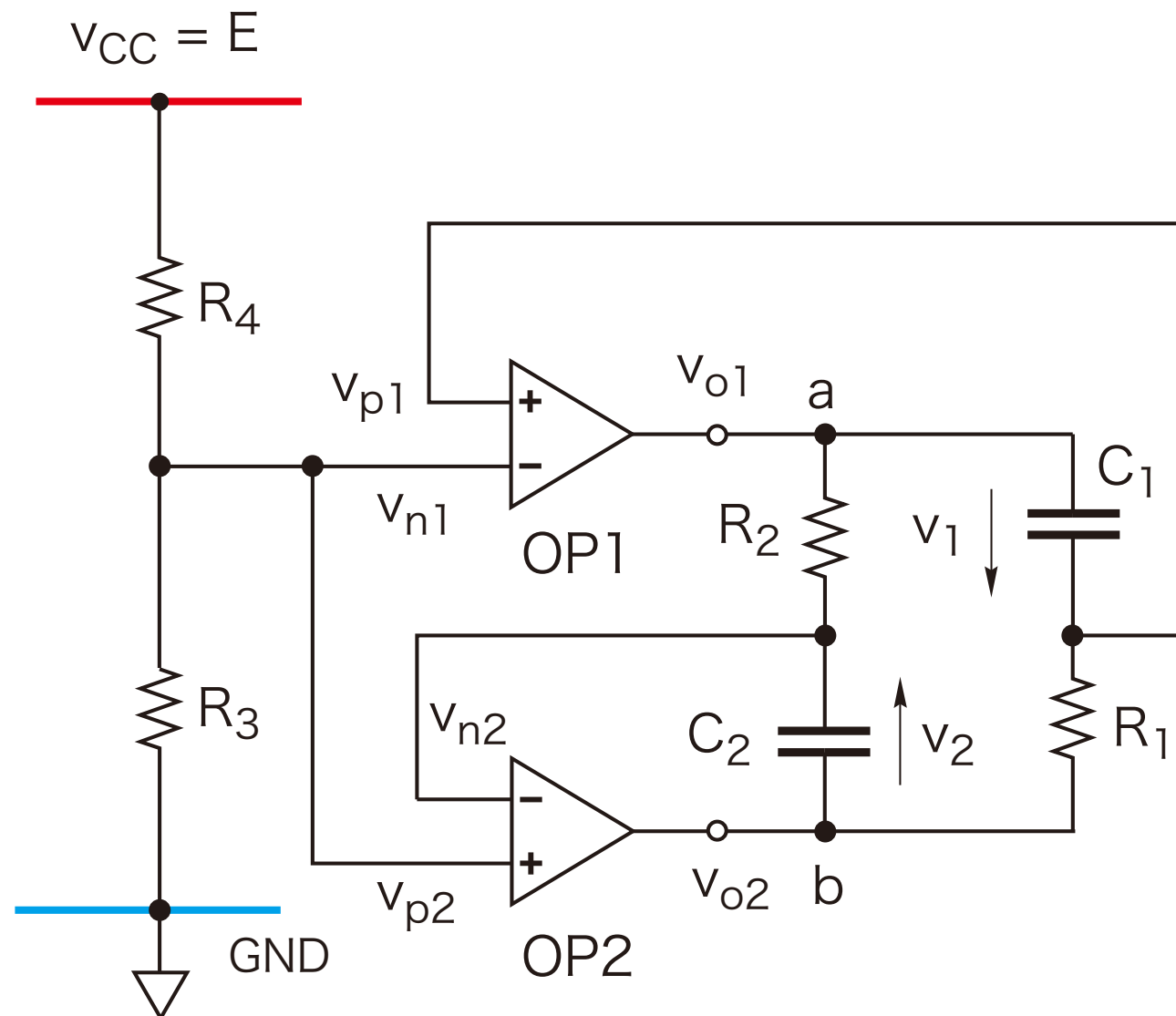
astable

multivibrator ⑧
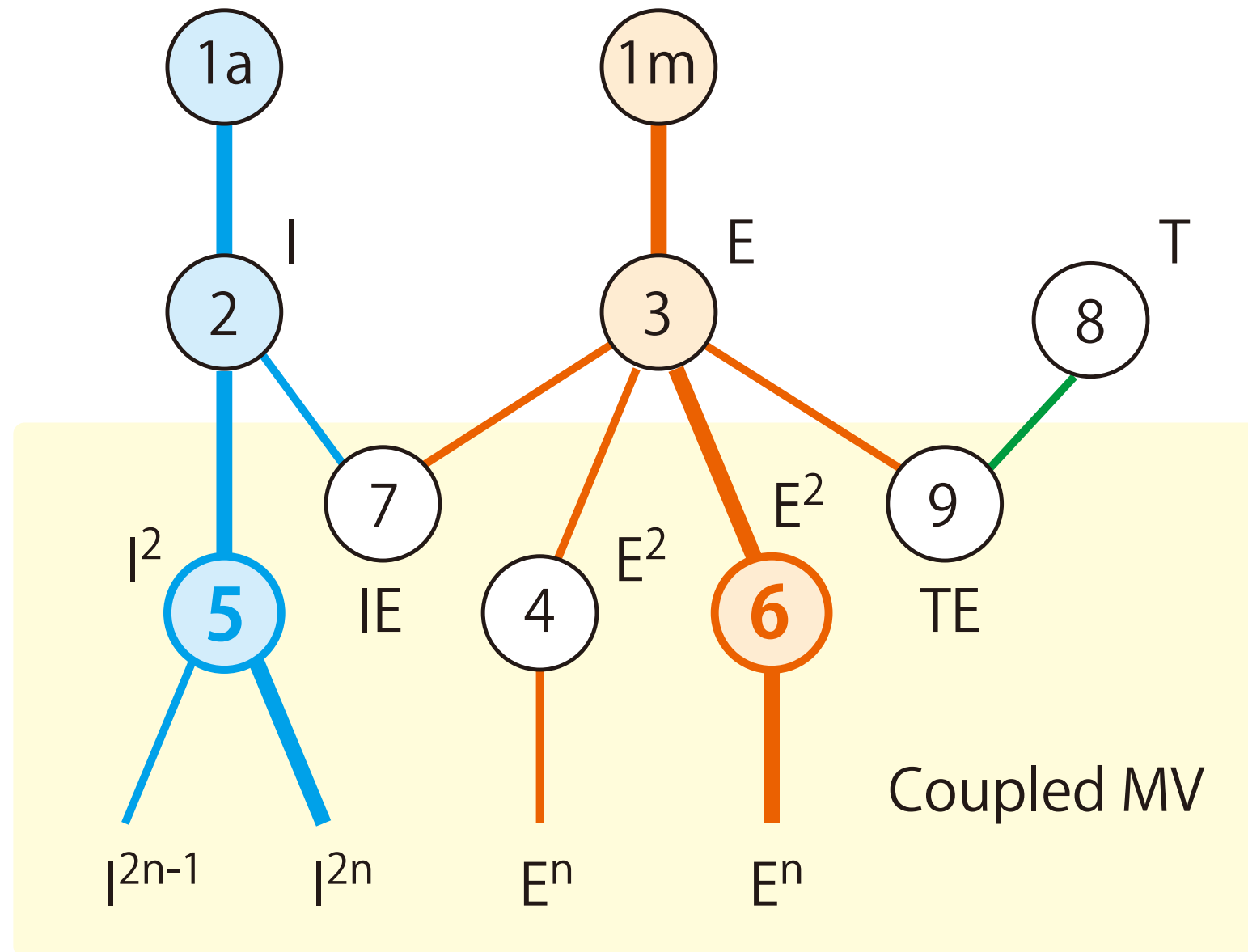
astable : triangular wave form

multivibrator 9

triangular wf

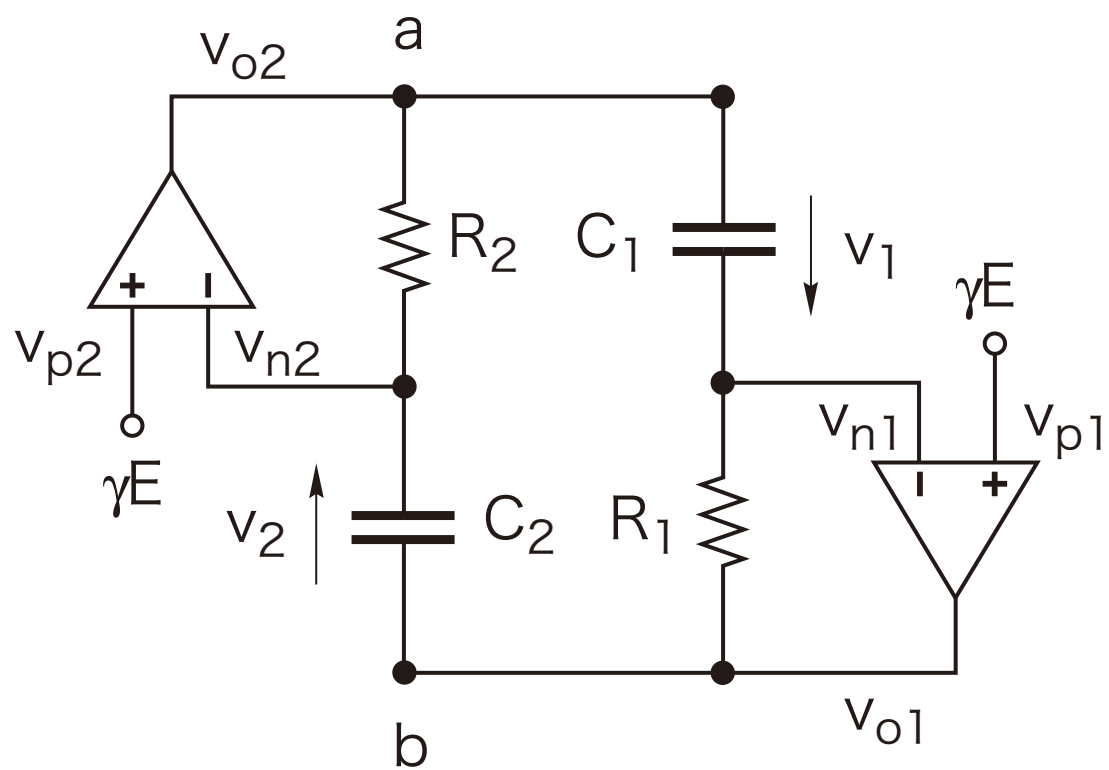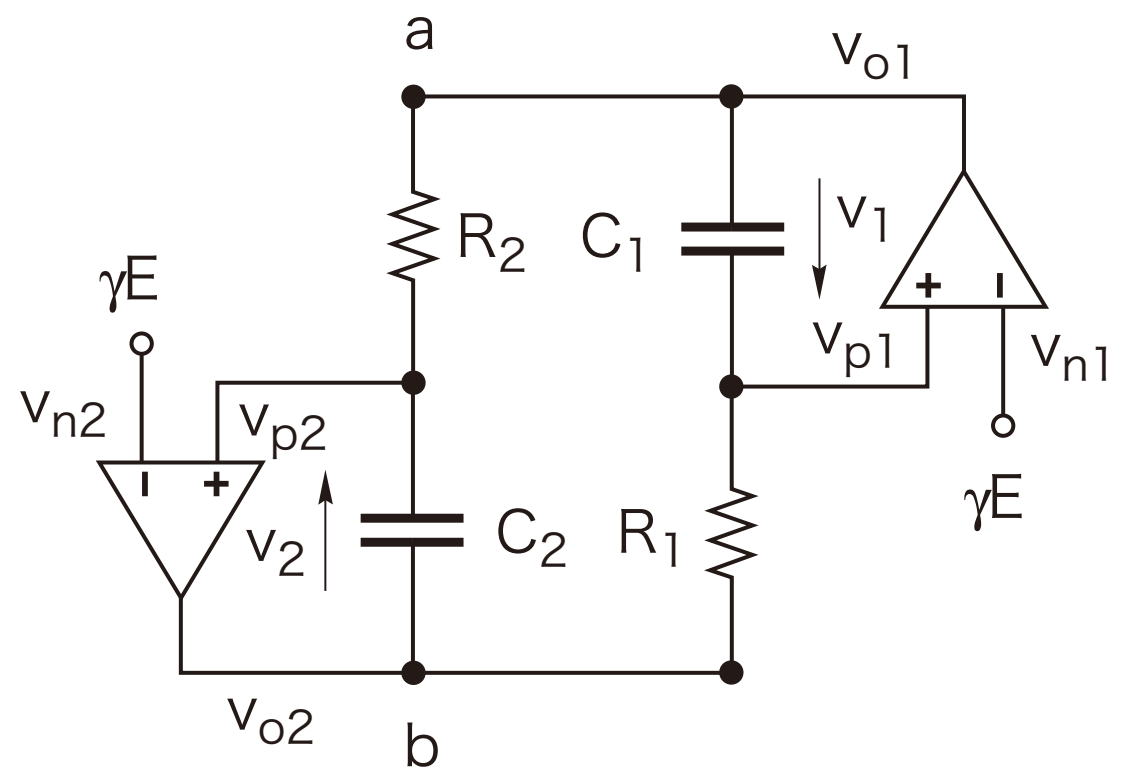# classification of multivibrators

Two kinds of multivibrators appear!

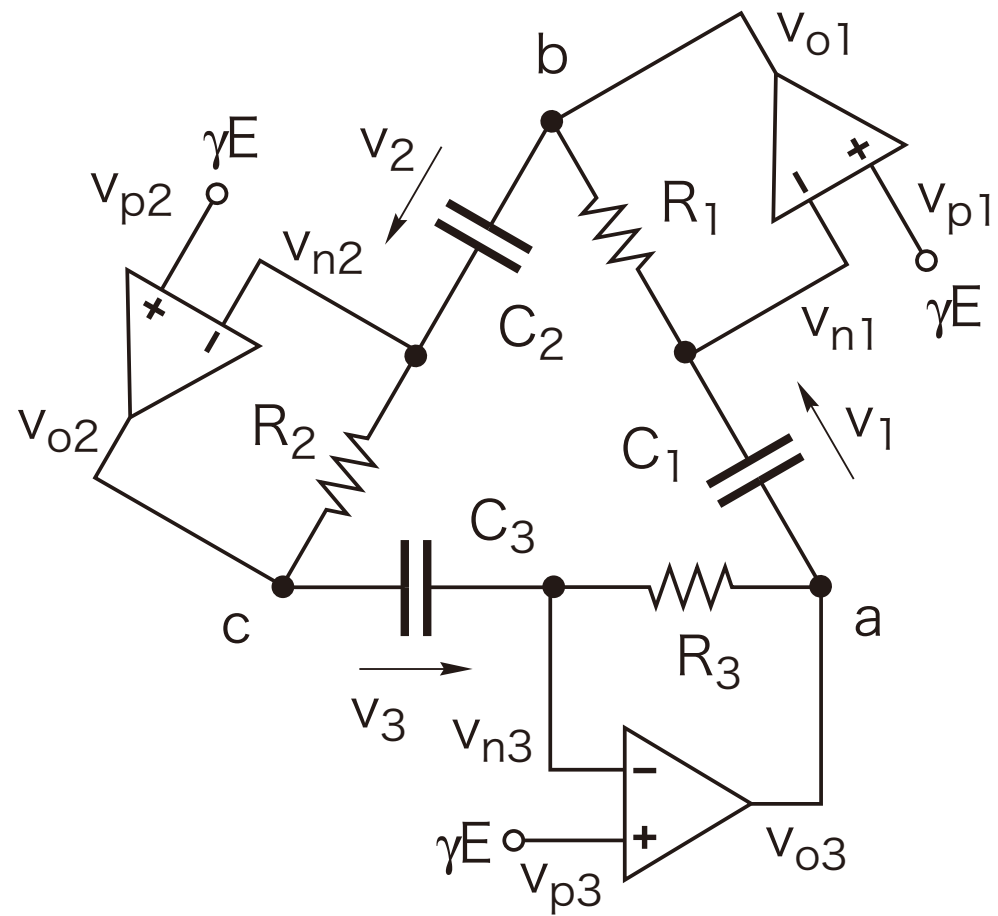# 2. Coupled multivibrators
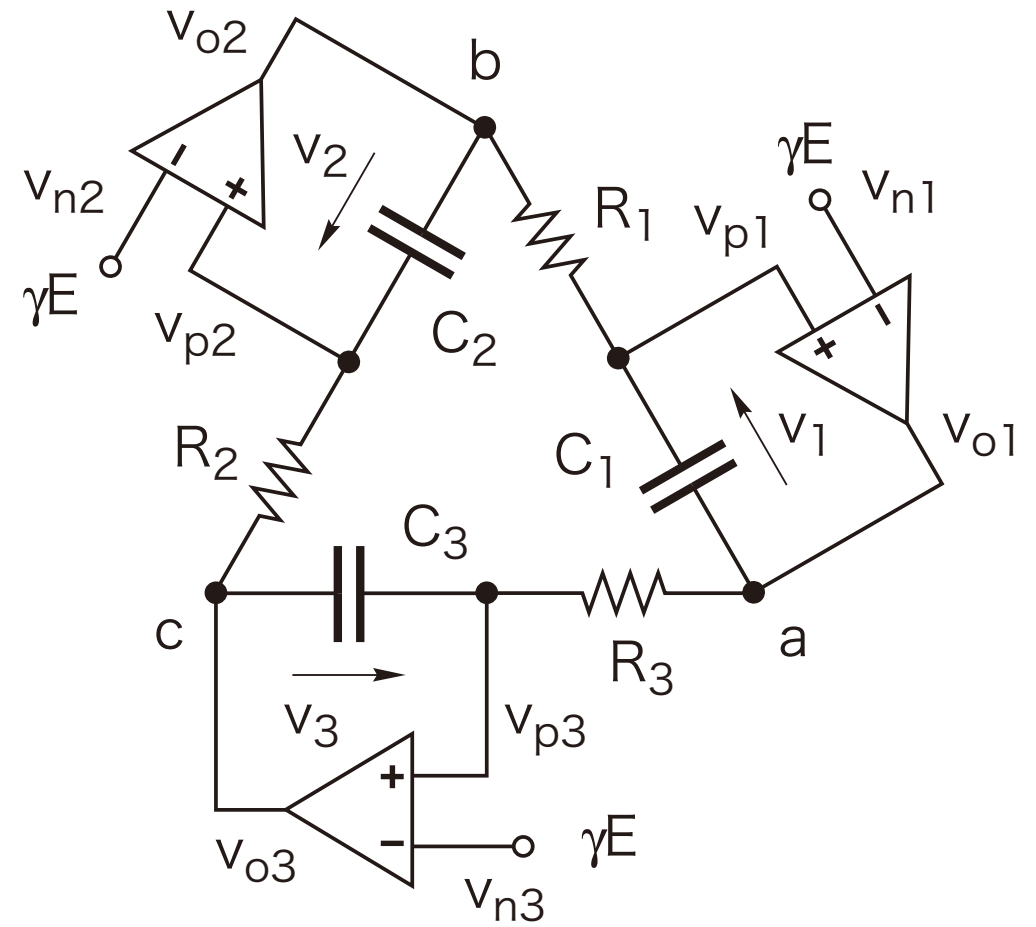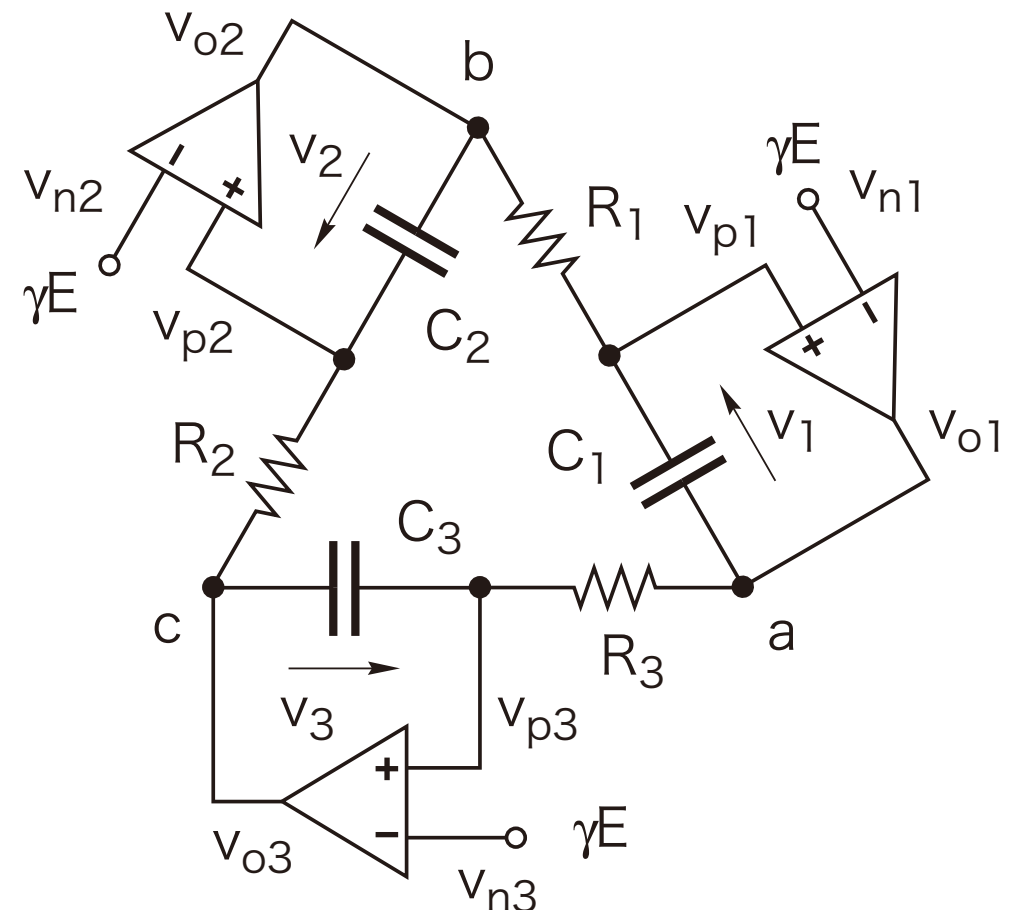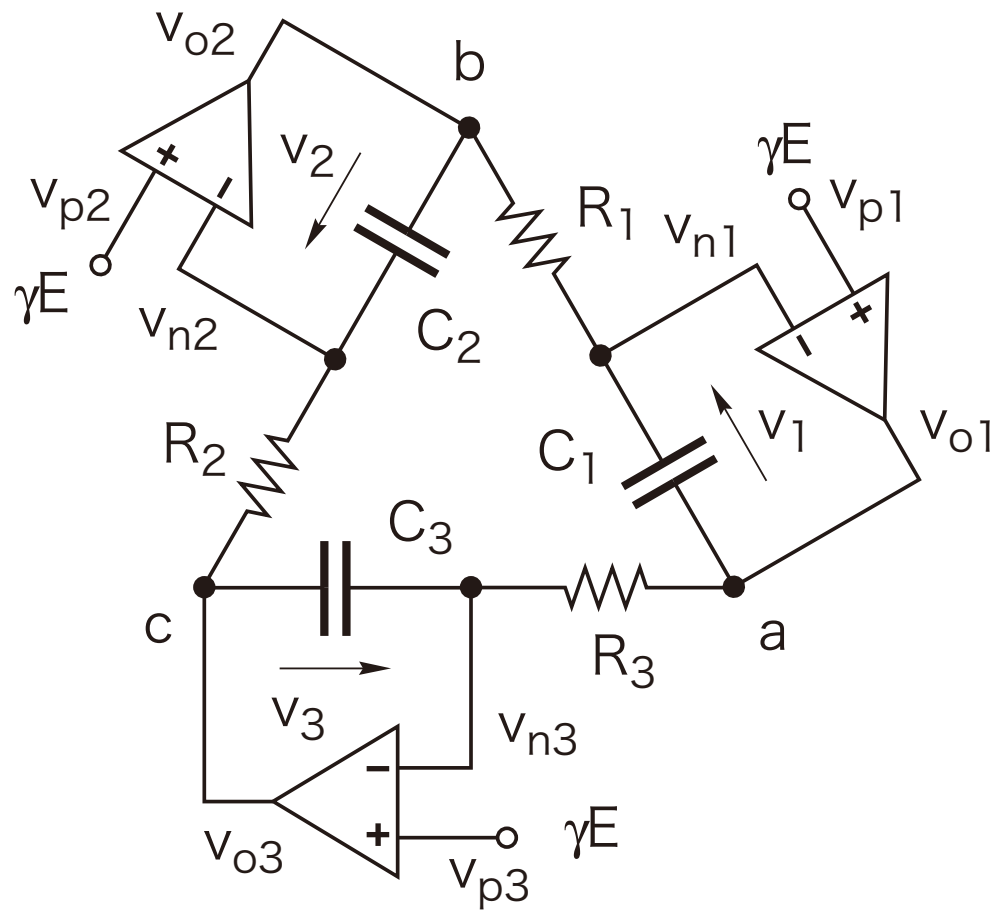
ring connection

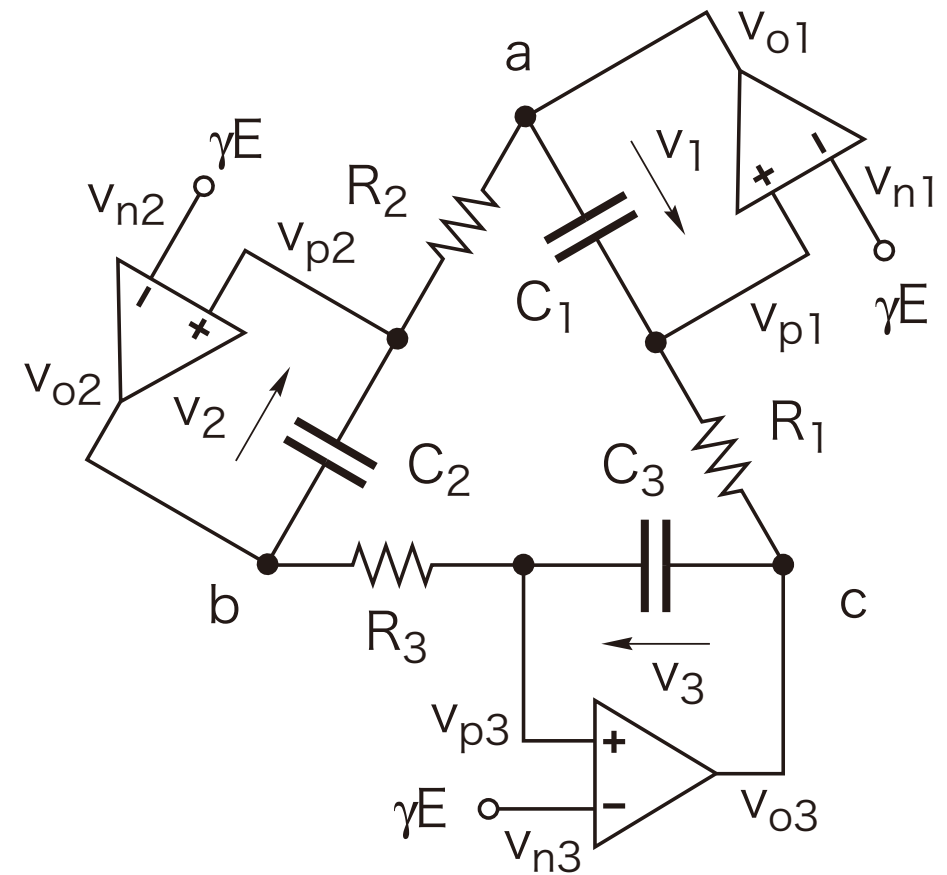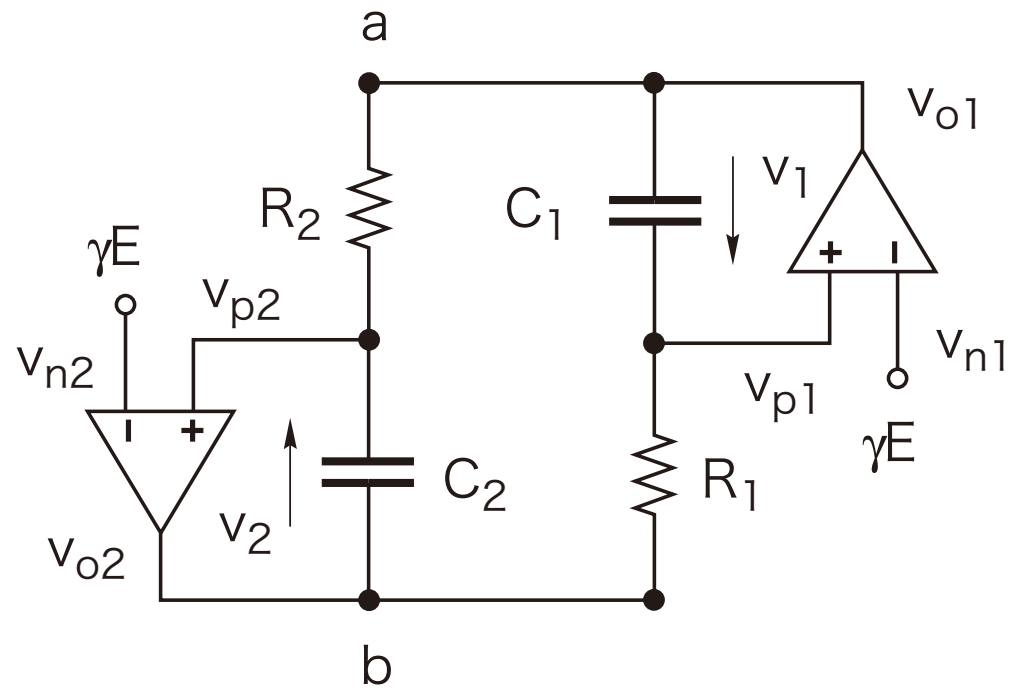# ring connection

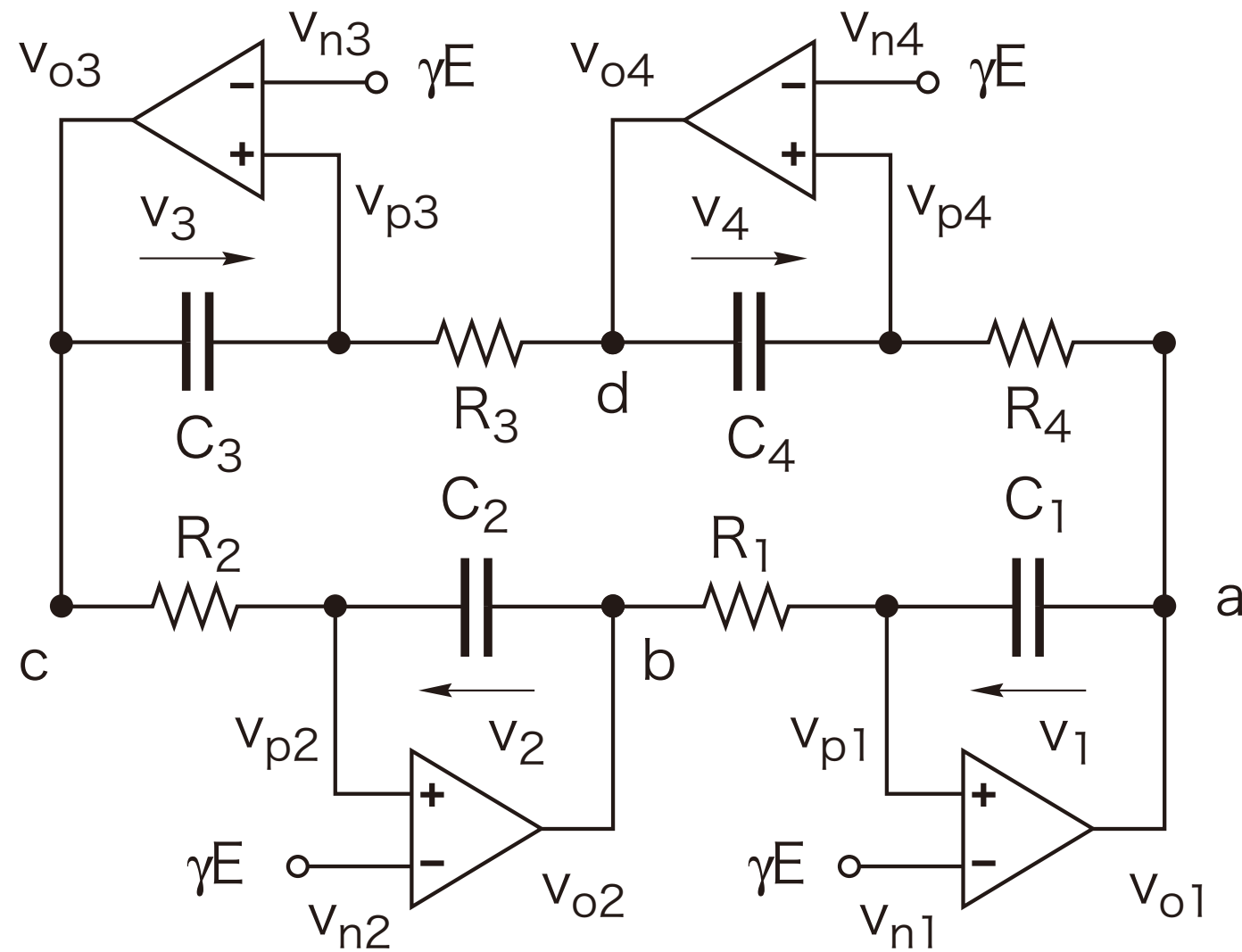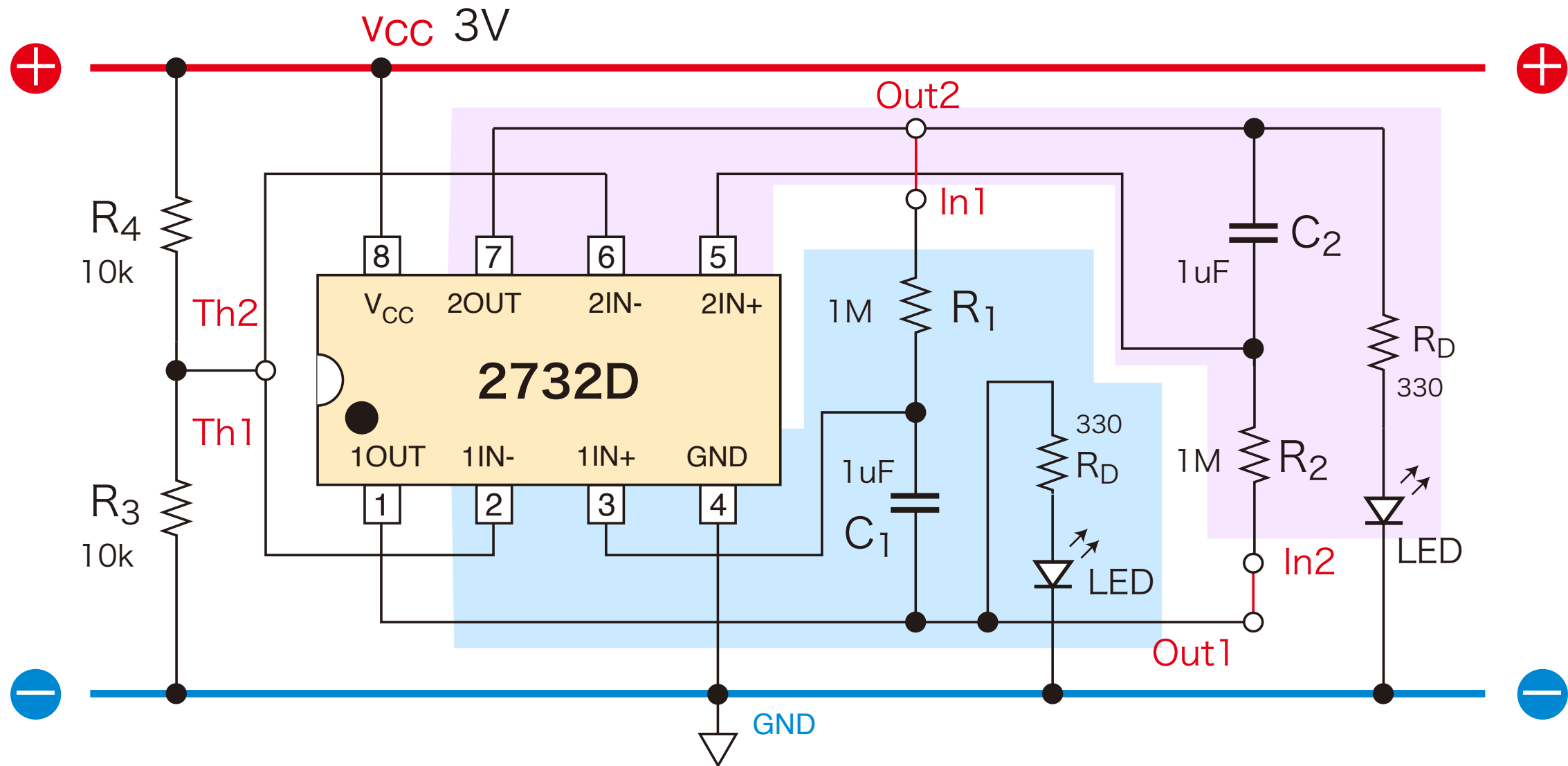# ring connection

Harmonic Oscillator

6

ring connection ⑥

ring connection ⑥
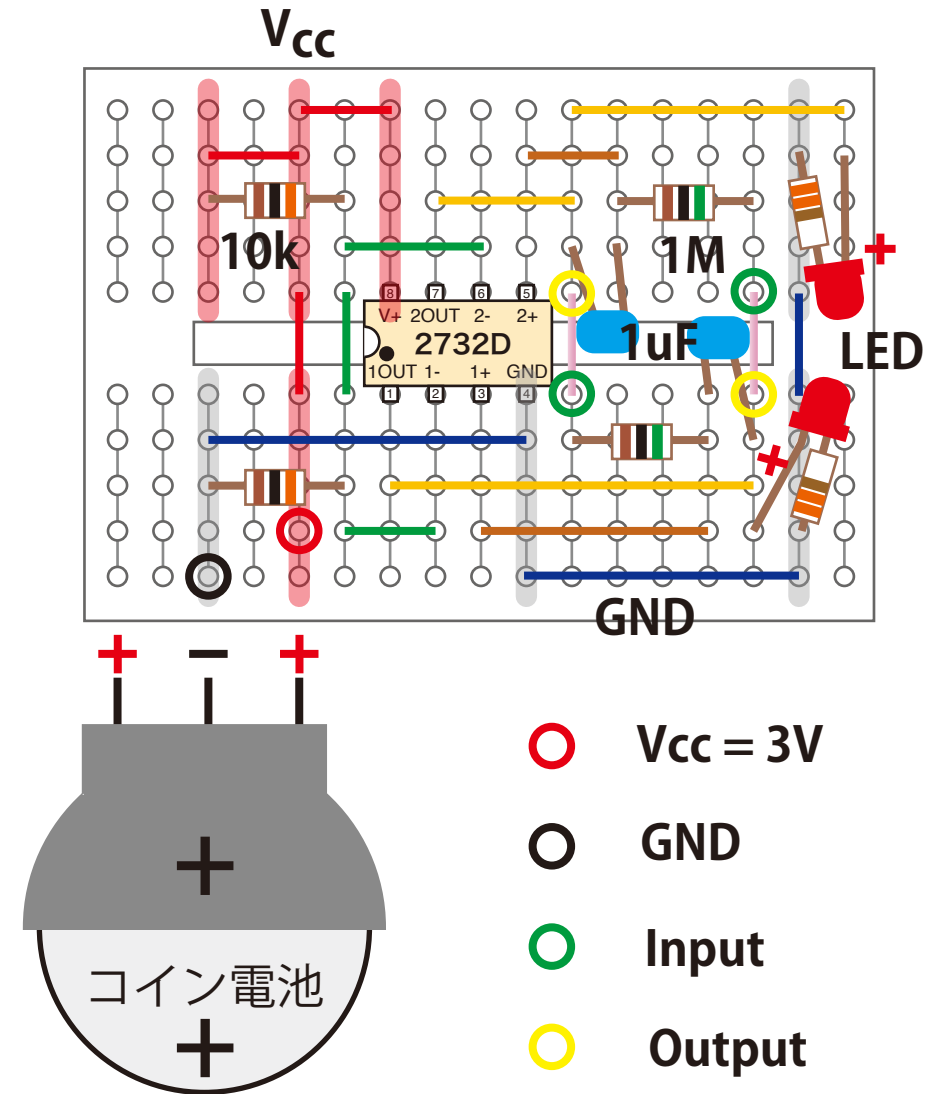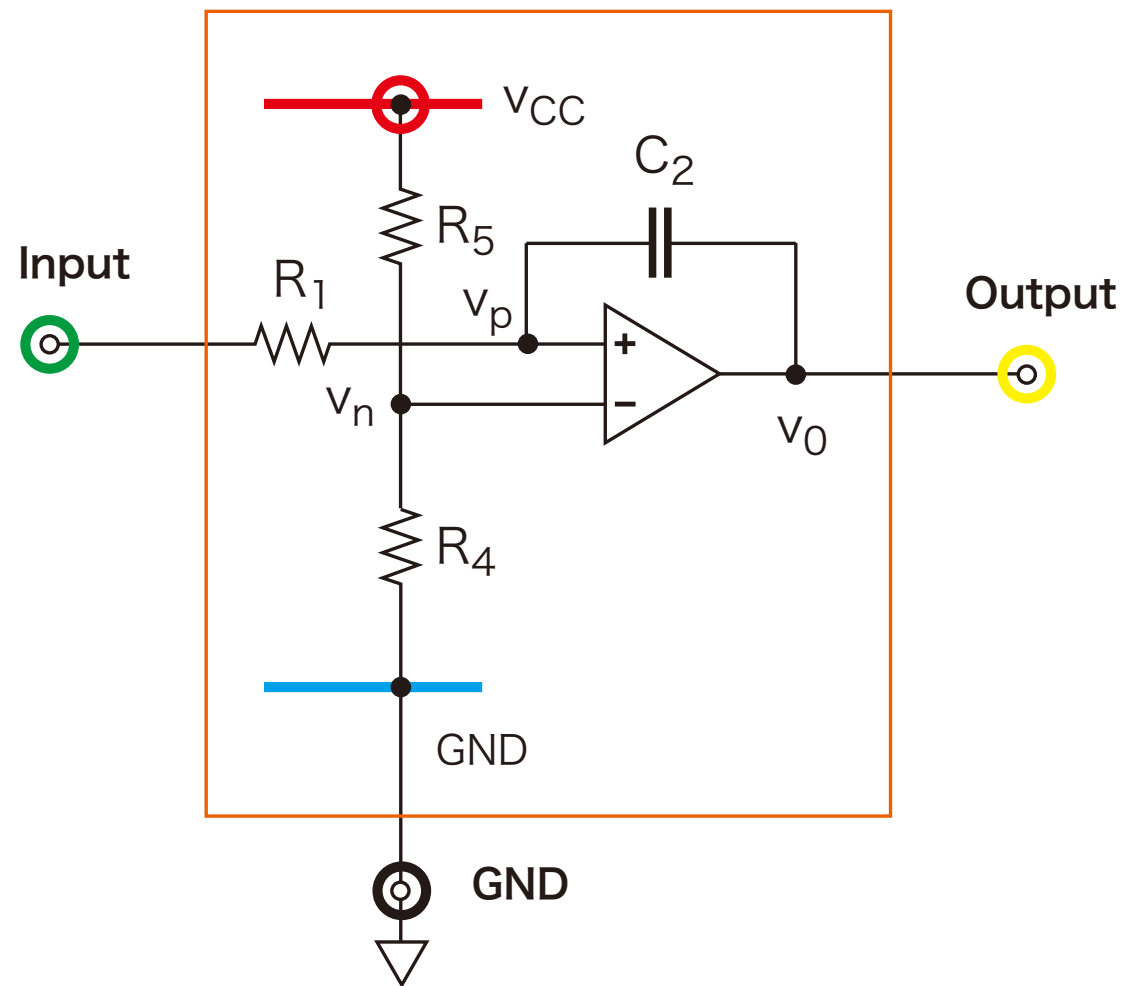
Appendix A Experiments

multivibrator ⑥

VCC 3V

R_4 10k

Th2

Th1

R_3 10k

2732D

8	7	6	5
V_{CC}	2OUT	2IN-	2IN+
1OUT	1IN-	1IN+	GND
1	2	3	4

Out2

In1

1M R_1

C_1 1uF

330 R_D

LED

C_2 1uF

1M R_2

R_D 330

In2

LED

Out1

GND

multivibrator ⑥

v_{CC}

Input

R_1

R_5

v_p

v_n

R_4

GND

GND

C_2

+

−

v_0

Output

V_{cc}

10k

2732D

1M

1uF

LED

GND

+

−

+

コイン電池

+

+

○ Vcc = 3V

○ GND

○ Input

○ Output
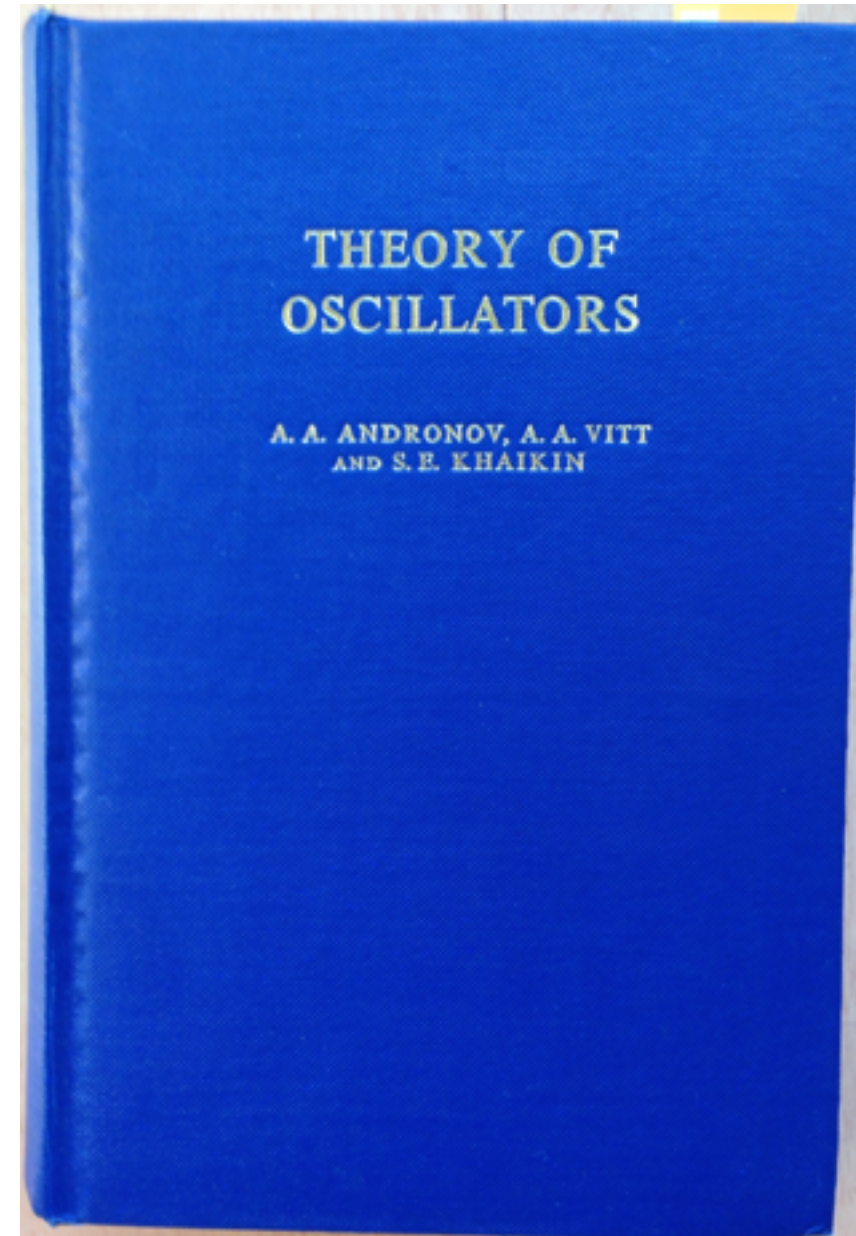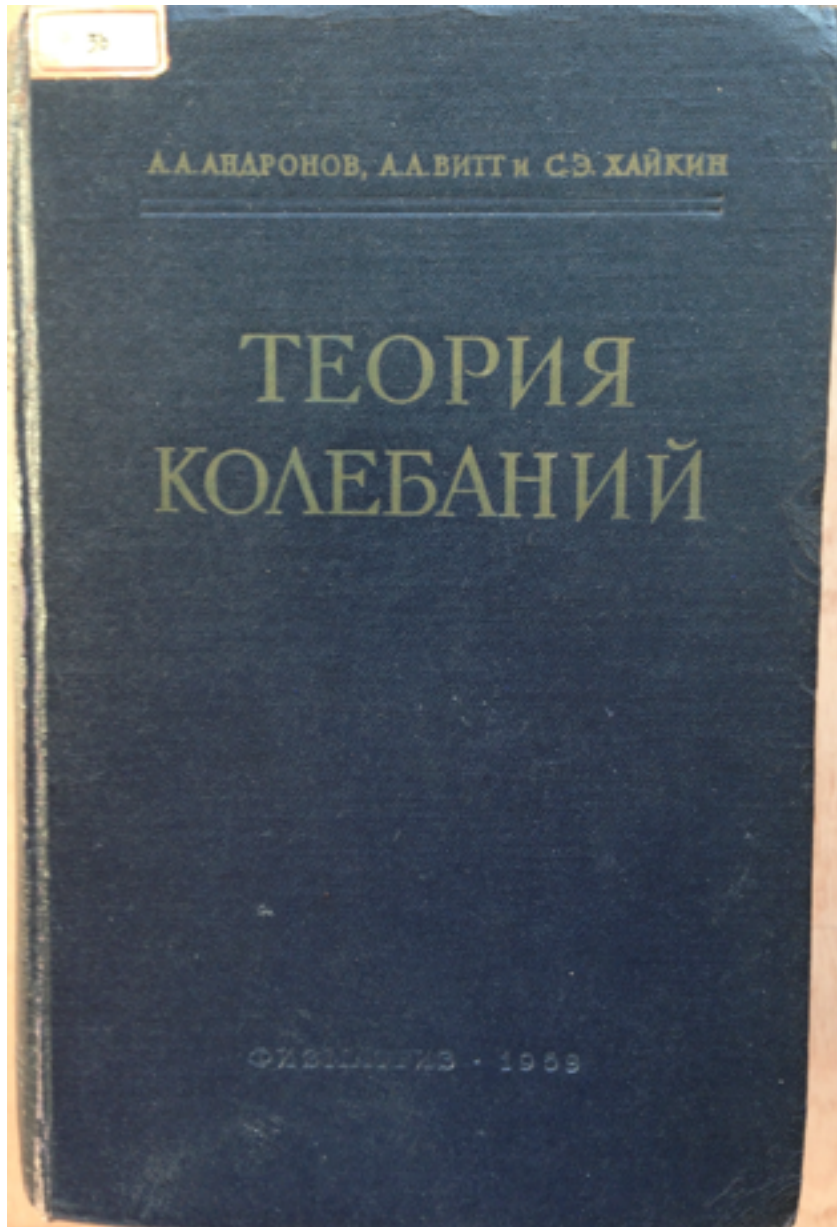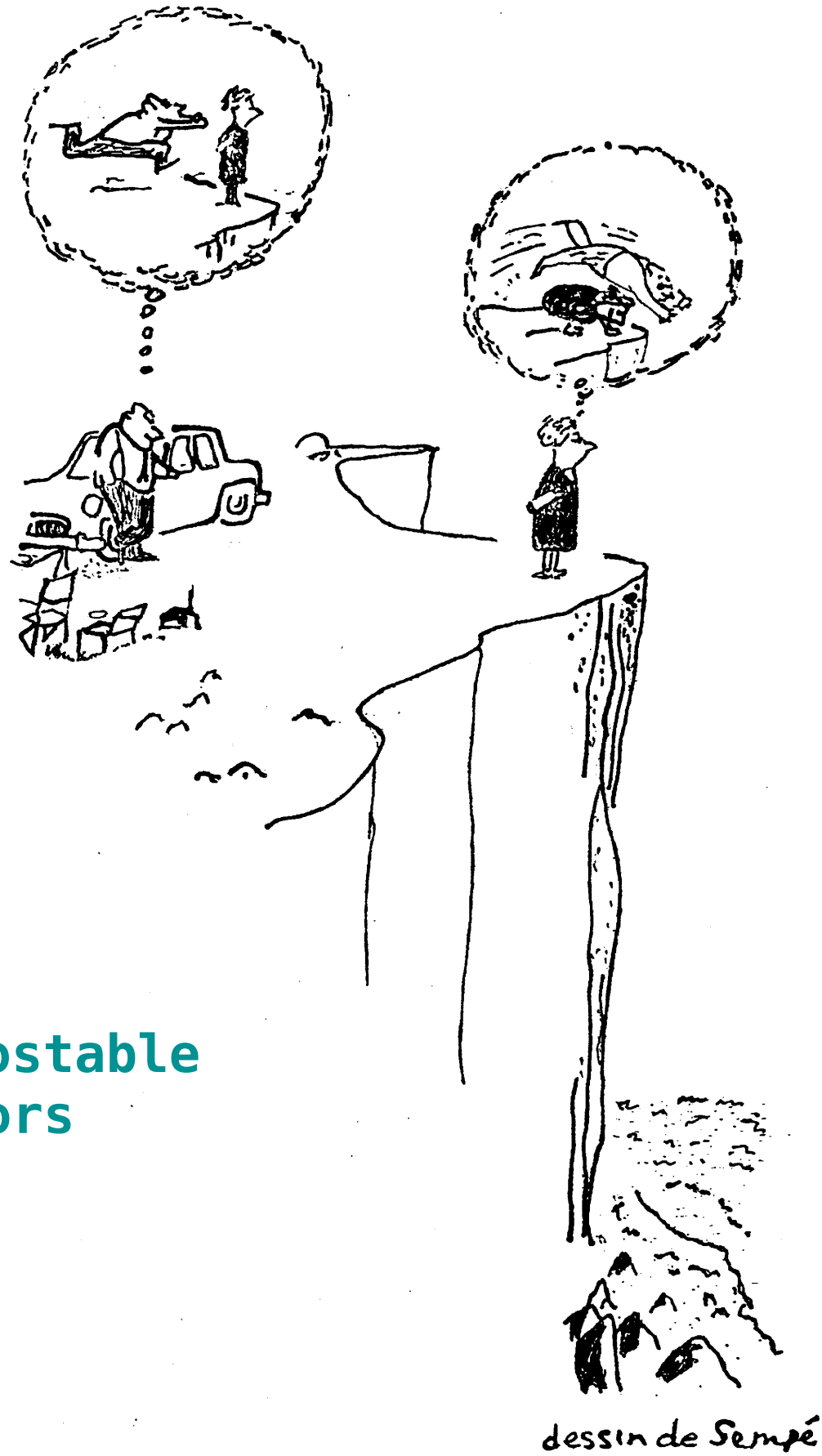
References

Controlling monostable multivibrators

dessin de Sempé