電子電路實驗 5：Oscillators

實驗預報

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1 Objectives

1. To be familiar with the Barkhausen criterion and various kinds of oscillators.

2 Procedures

2.1 Sinusoidal oscillators: Wien-bridge oscillator

1. In Fig. 3, disconnect $D_1, D_2, R_3, R_4, R_5, R_6$, use $R_1 = 3.3\,\mathrm{k}\Omega, R_2 = 10\,\mathrm{k}\Omega$.
2. Oscilloscope ▷Press the `Display` button ▷`Format` ▷`YT mode`.
3. Measure and record $V_{out(p-p)}, f$.
4. Now connect $D_1, D_2, R_3, R_4, R_5, R_6$, use $R_1 = 3.3\,\mathrm{k}\Omega, R_2 = 10\,\mathrm{k}\Omega$.
5. Oscilloscope ▷Press the `Display` button ▷`Format` ▷`YT mode`.
6. Adjust VR(R_2) until the sinusoidal vibration with the **mininmum amplitude** occurs in V_{out}.
7. Measure and record $V_{out(p-p)}, f, R_2, R_2/R_1$.
8. Adjust VR(R_2) until the sinusoidal vibration with the **maximum amplitude** occurs in V_{out}.
9. Measure and record $V_{out(p-p)}, f, R_2, R_2/R_1$.

2.2 Sinusoidal oscillators: Phase-shift oscillator

1. In Fig. 4, use the designed value from Pre-Lab Work for components.
2. Oscilloscope ▷Press the `Display` button ▷Format ▷`YT mode`.
3. Adjust VR(R_1) until the sinusoidal vibration with the **mininmum amplitude** occurs in V_{out}.
4. Measure and record $V_{out(p-p)}, f, R_1, R_1/R1$.

5. Adjust VR(R_1) until the sinusoidal vibration with the **maximum amplitude** occurs in V_{out}.
6. Measure and record $V_{out(p-p)}, f, R_1, R_1/R$.

2.3 Triangular waveform generator: RC-circuit bistable multivibrator

1. In Fig. 5, use the designed value from PR for components.
2. Oscilloscope ▷Press the `Display` button ▷`Format` ▷`YT mode`.
3. Record $V_{out(p-p)}, f, R_1, R_2, R_3, C$

2.4 Triangular waveform generator: Integrator bistable multivibrator

1. In Fig. 6, use the designed value from PR for components.
2. Oscilloscope ▷Press the `Display` button ▷`Format` ▷`YT mode`.
3. Record $V_{out(p-p)}, f, R_2, R_3$