

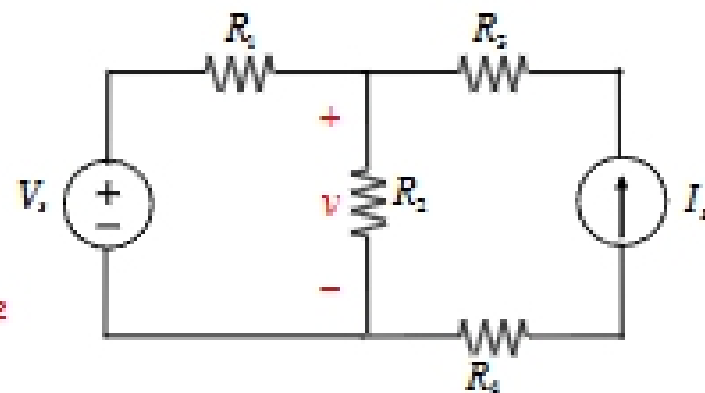
Principle of Superposition

- ◆ Linear circuits
- ◆ Multi sources
- ◆ Total response = sum of individual responses

Example:

V_1 Contribution of the first source

V_2 Contribution of the second source



Total value

$$V = V_1 + V_2$$

Turning independent sources "ON" and "OFF"

Voltage Source



ON



OFF

To turn voltage source off,
Replace it by short circuit branch.

Current Source

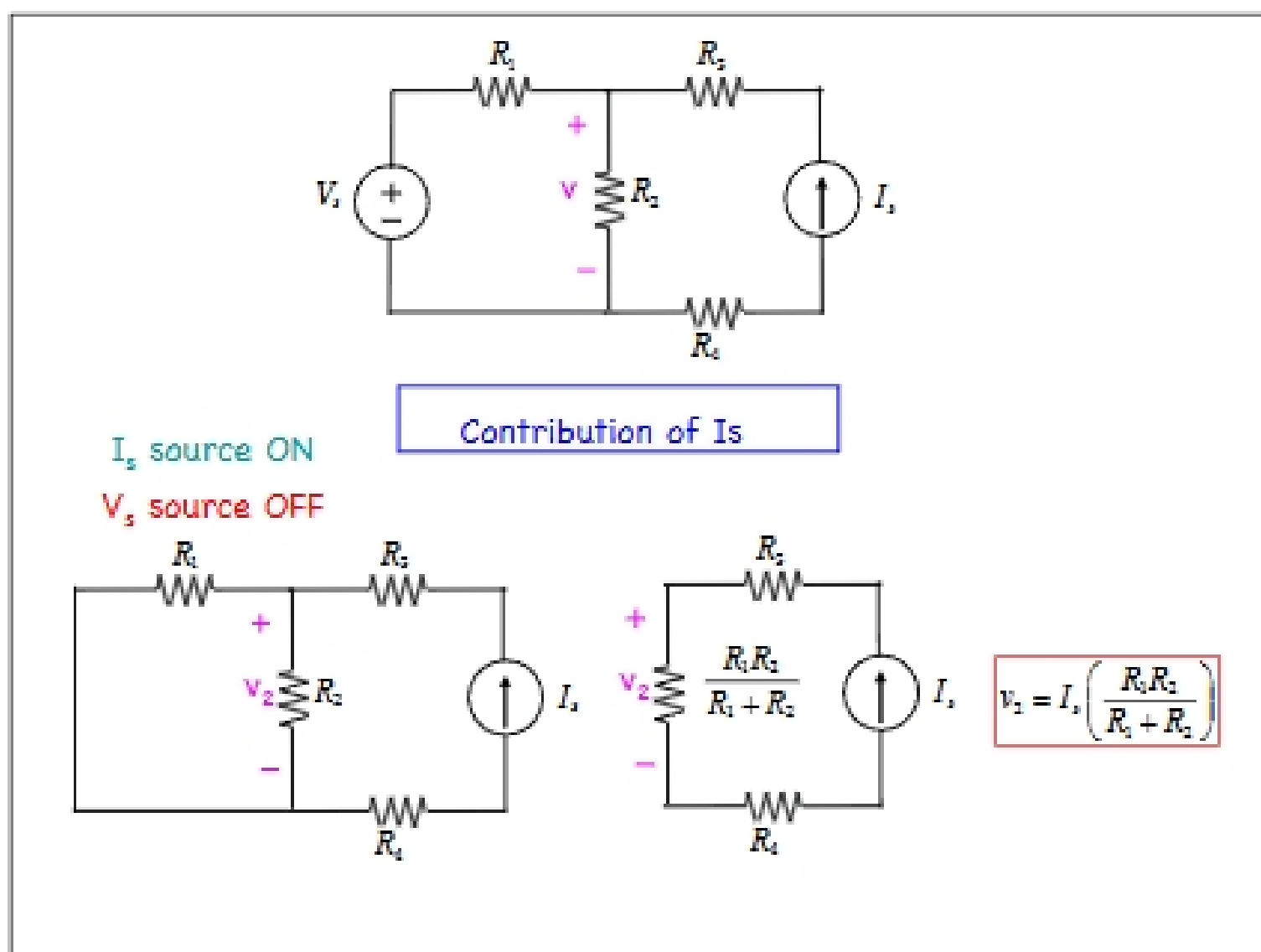
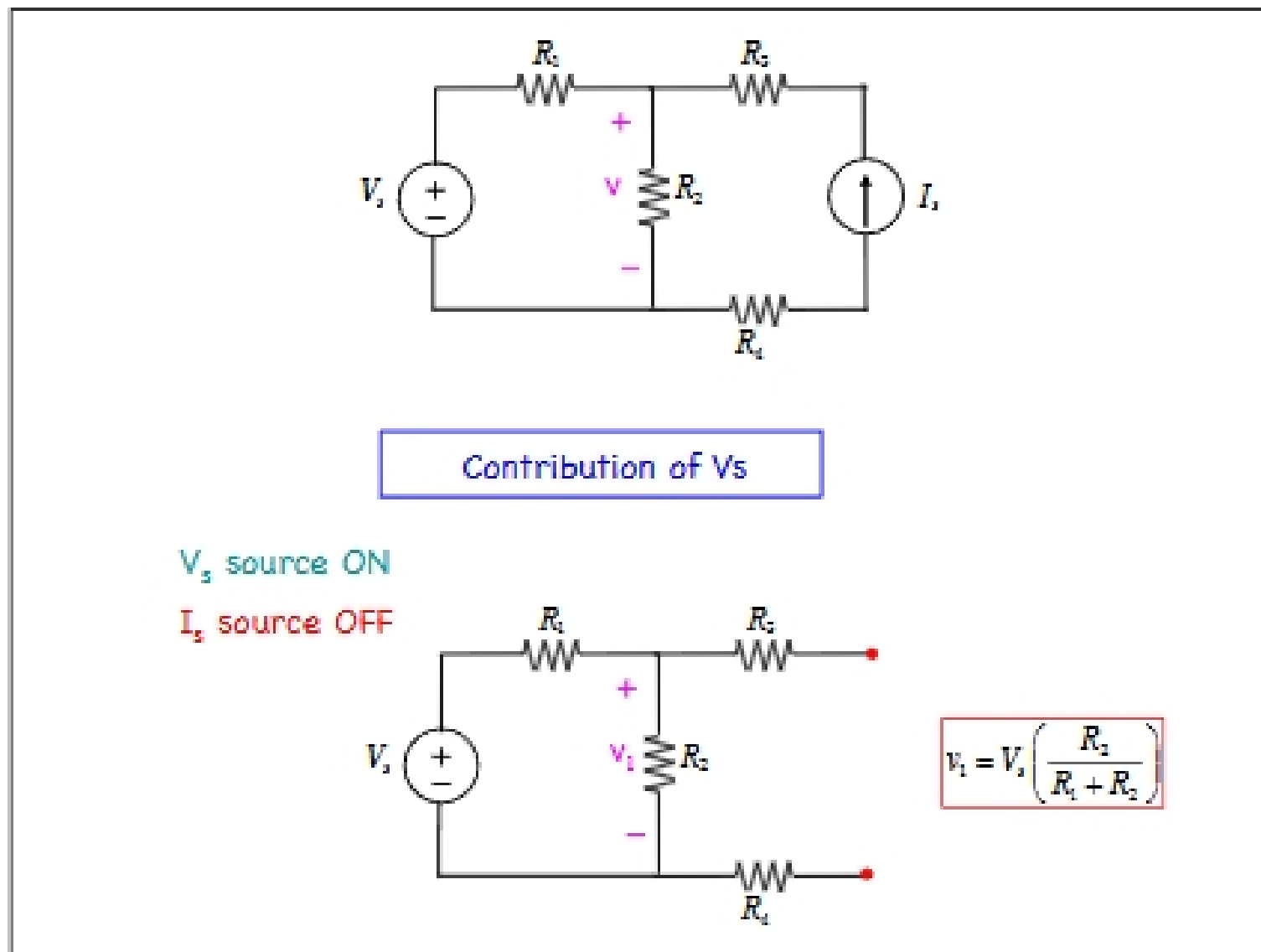


ON



OFF

To turn current source off,
Replace it by open circuit.

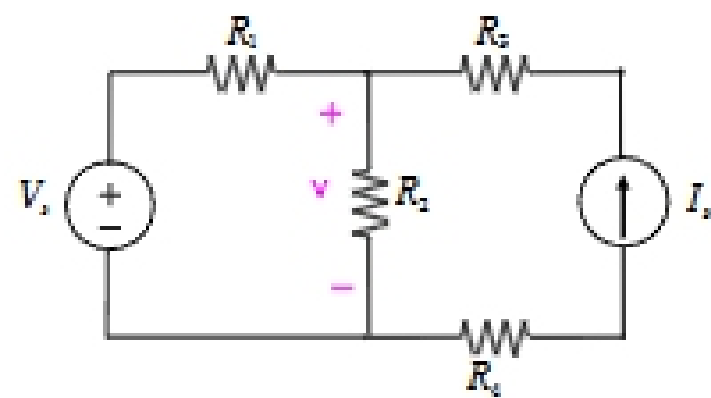


Total response = sum of individual responses

$$v = v_1 + v_2$$

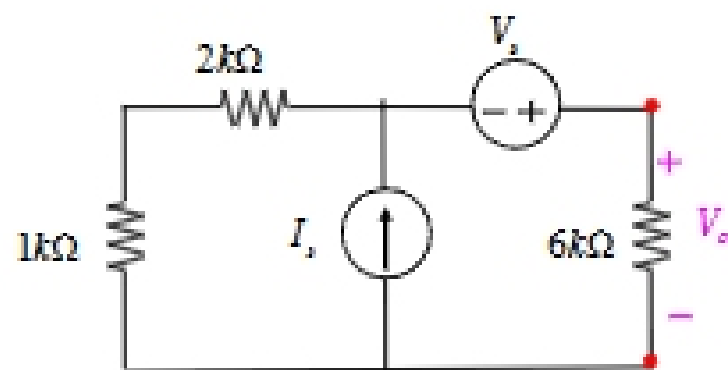
$$v_1 = V_s \left(\frac{R_2}{R_1 + R_2} \right)$$

$$v_2 = I_s \left(\frac{R_1 R_2}{R_1 + R_2} \right)$$



$$v = V_s \left(\frac{R_2}{R_1 + R_2} \right) + I_s \left(\frac{R_1 R_2}{R_1 + R_2} \right)$$

Example (1)



For the circuit shown, adjust the values of I_s and V_s to get $v_o = 6V$

Hint: Use superposition principle to get v_o .