LE PONT DE WHEATSTONE

LEÇON 11

Électrotechnique I

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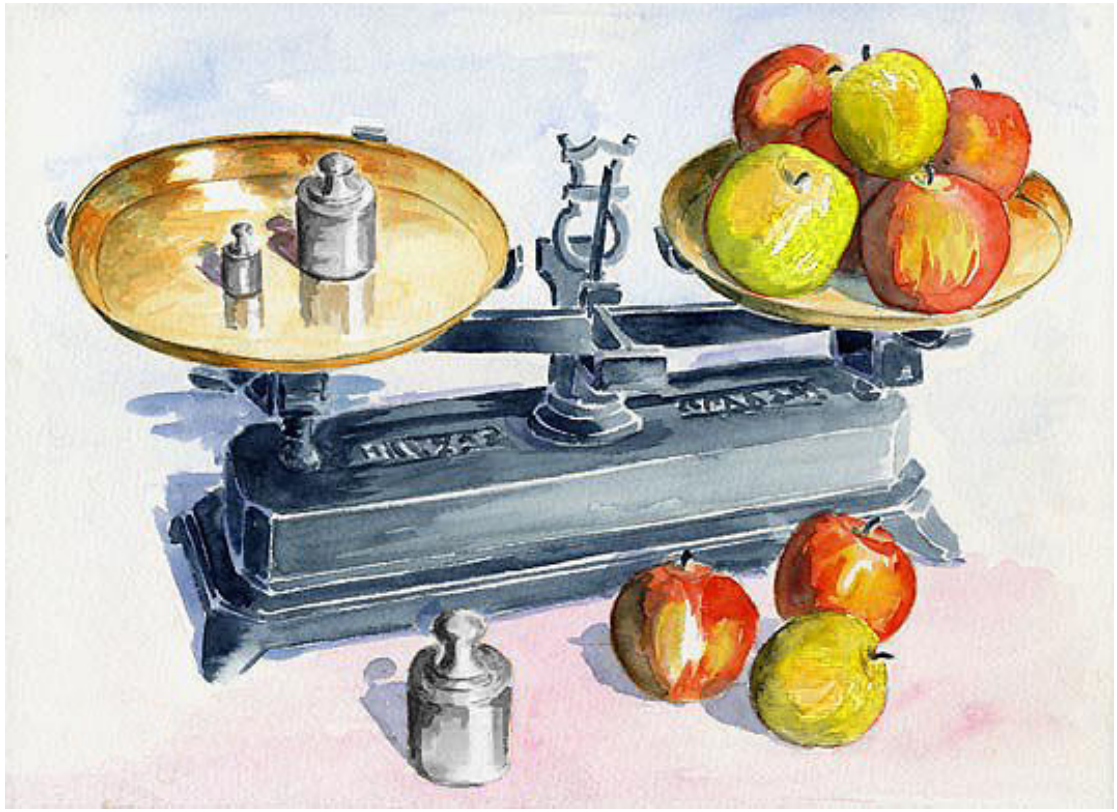
INTRODUCTION

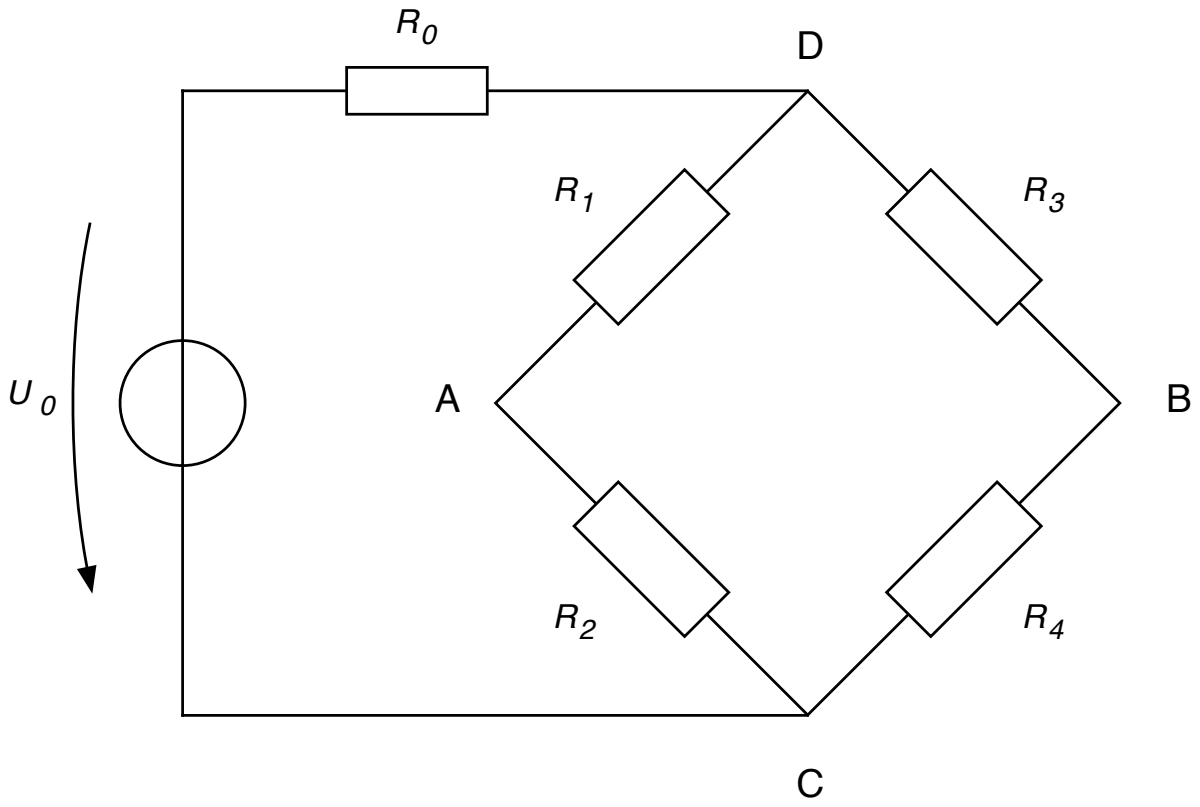
Généralités

- Analogie
- Description du circuit
- Equilibre - Condition d'équilibre
- Exemples d'application
- Conclusion

Analogie

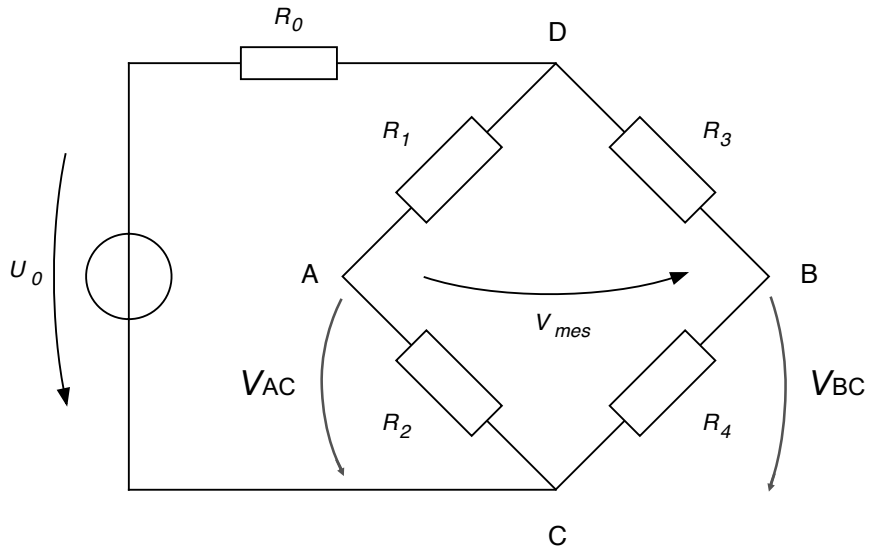


Description du circuit - Equilibre

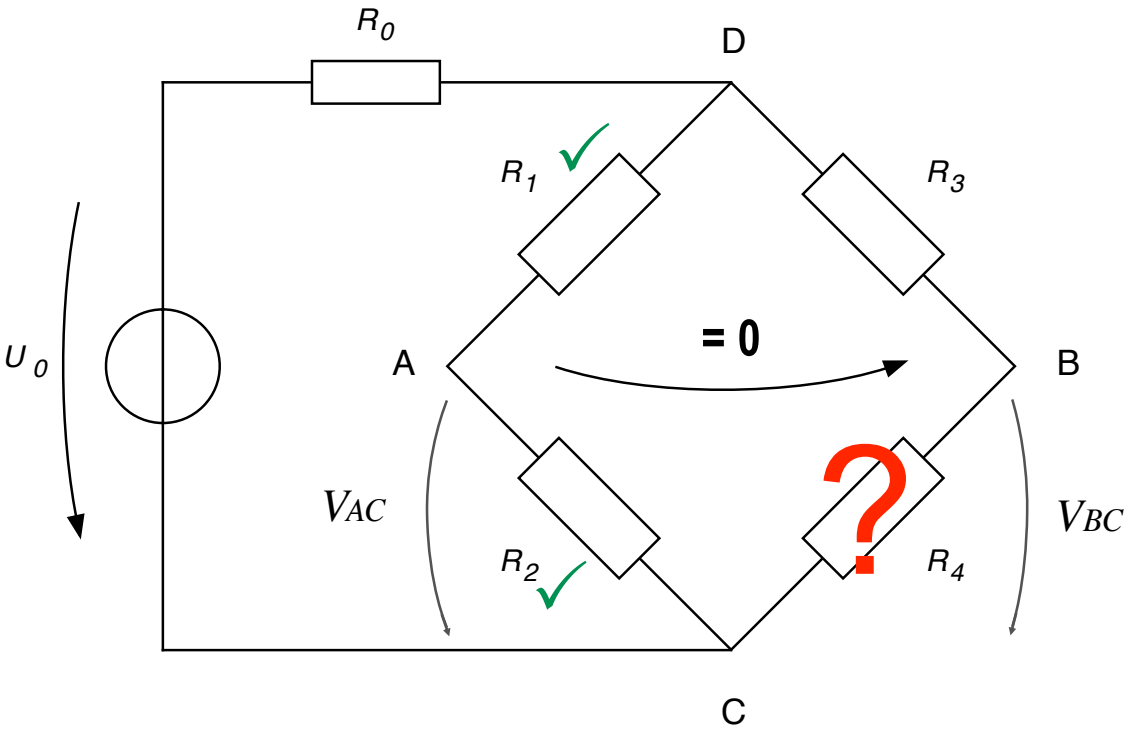


LE PONT DE WHEATSTONE

Condition d'équilibre



Exemple d'application 1 – Mesure de résistance

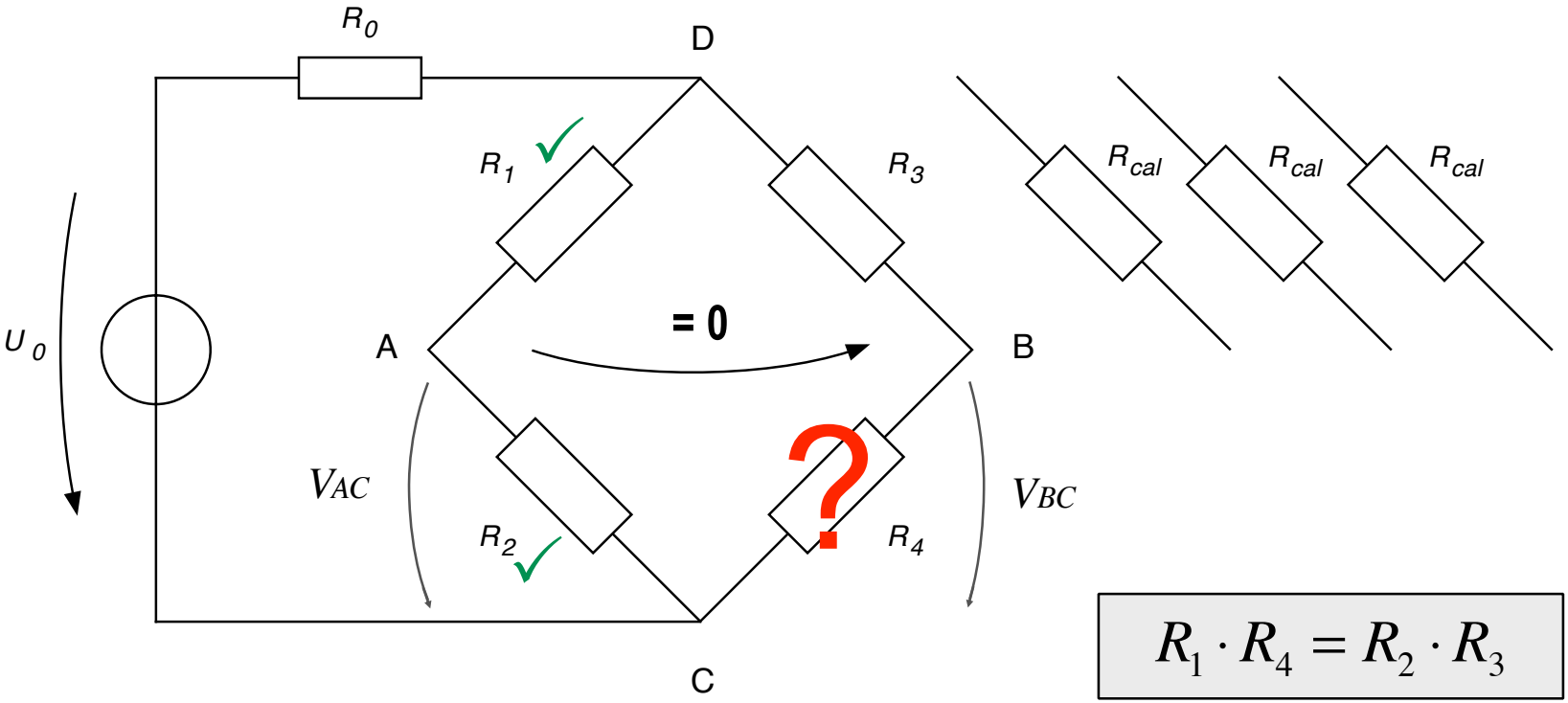


$$R_1 \cdot R_4 = R_2 \cdot R_3$$

$$V_{AC} = V_{DC} \frac{R_2}{R_1 + R_2}$$

$$V_{BC} = V_{DC} \frac{R_4}{R_3 + R_4}$$

Exemple d'application 1 – Résistances calibrées



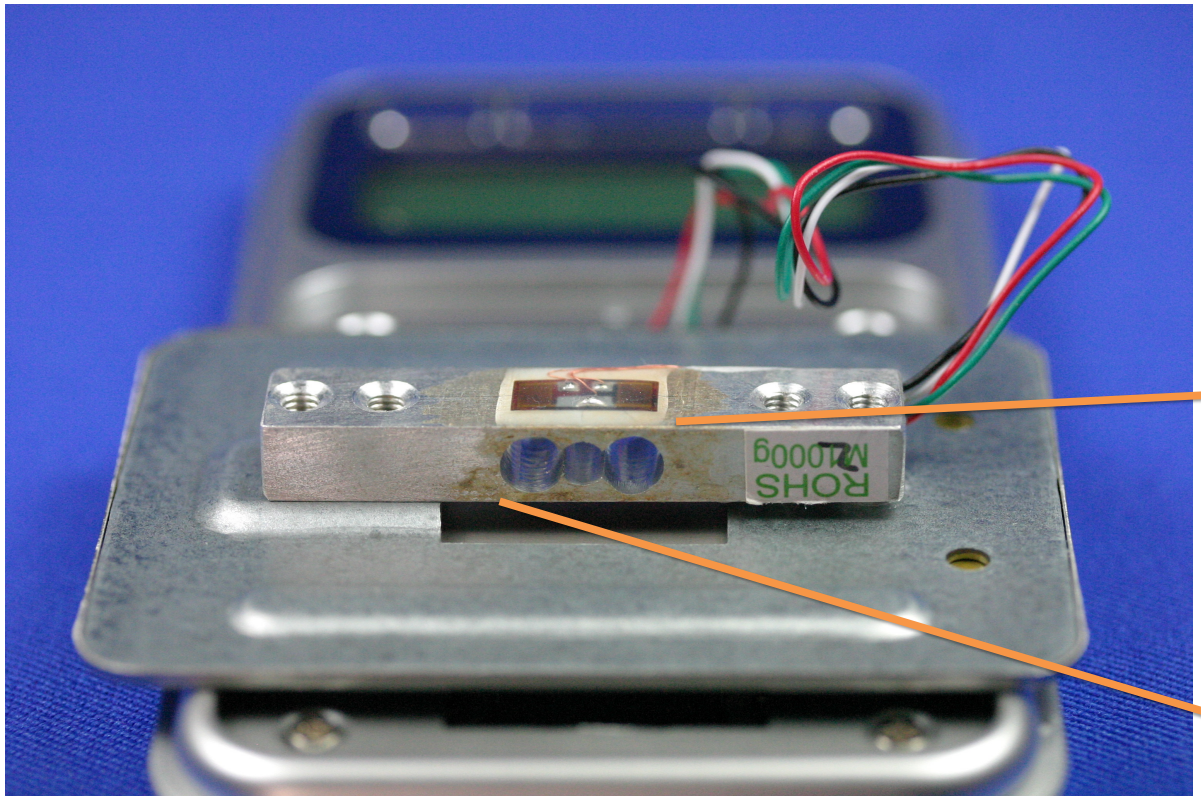
$$R_1 \cdot R_4 = R_2 \cdot R_3$$

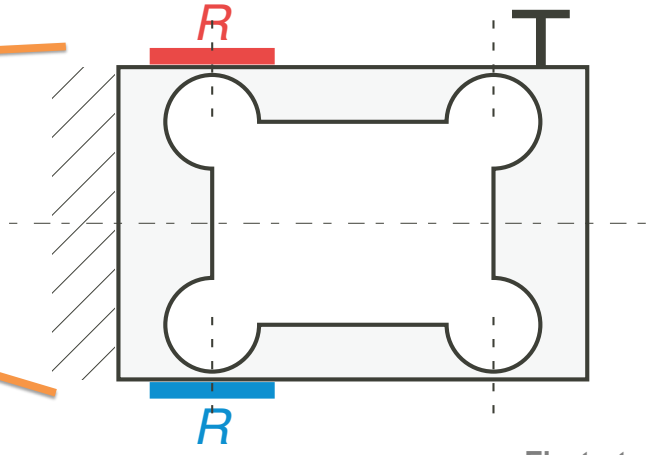
=>

$$V_{AC} = V_{DC} \frac{R_2}{R_1 + R_2}$$

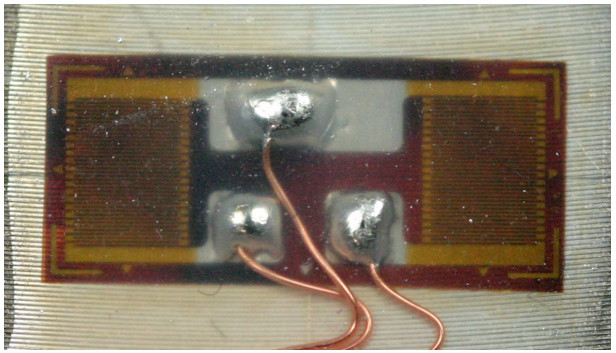
$$V_{BC} = V_{DC} \frac{R_4}{R_3 + R_4}$$

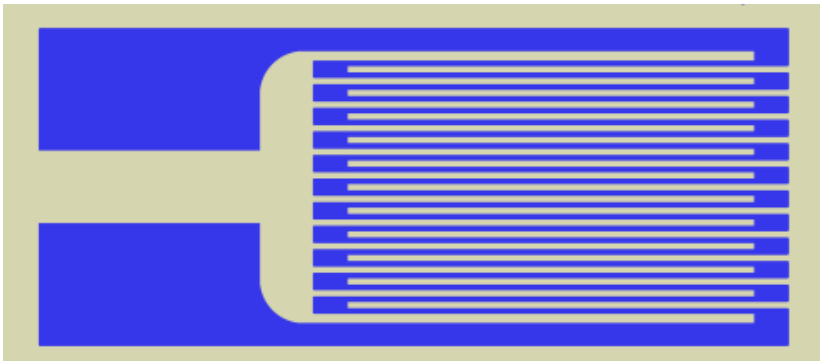
Exemple d'application 2 – Balance électronique



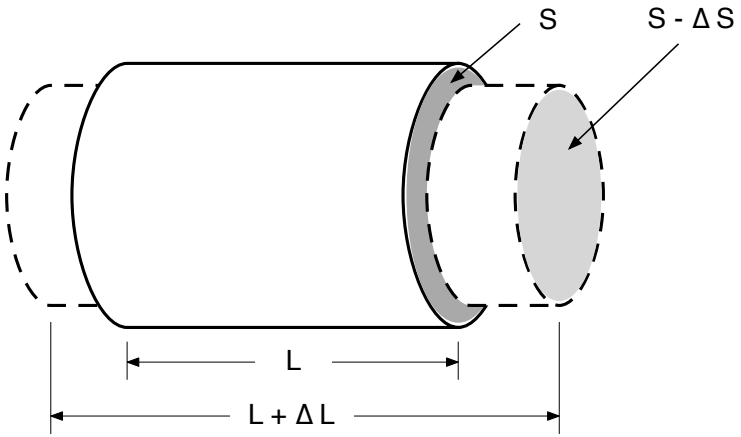


Exemple d'application 2 – Jauge d'extension

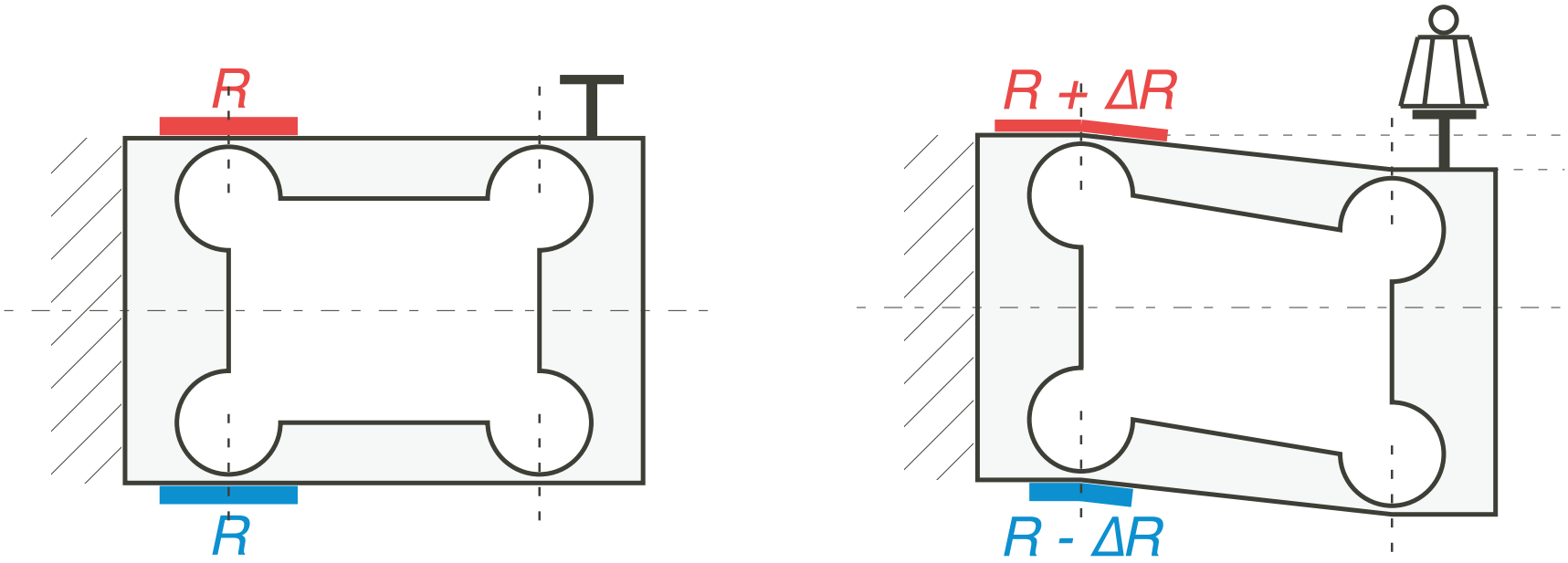




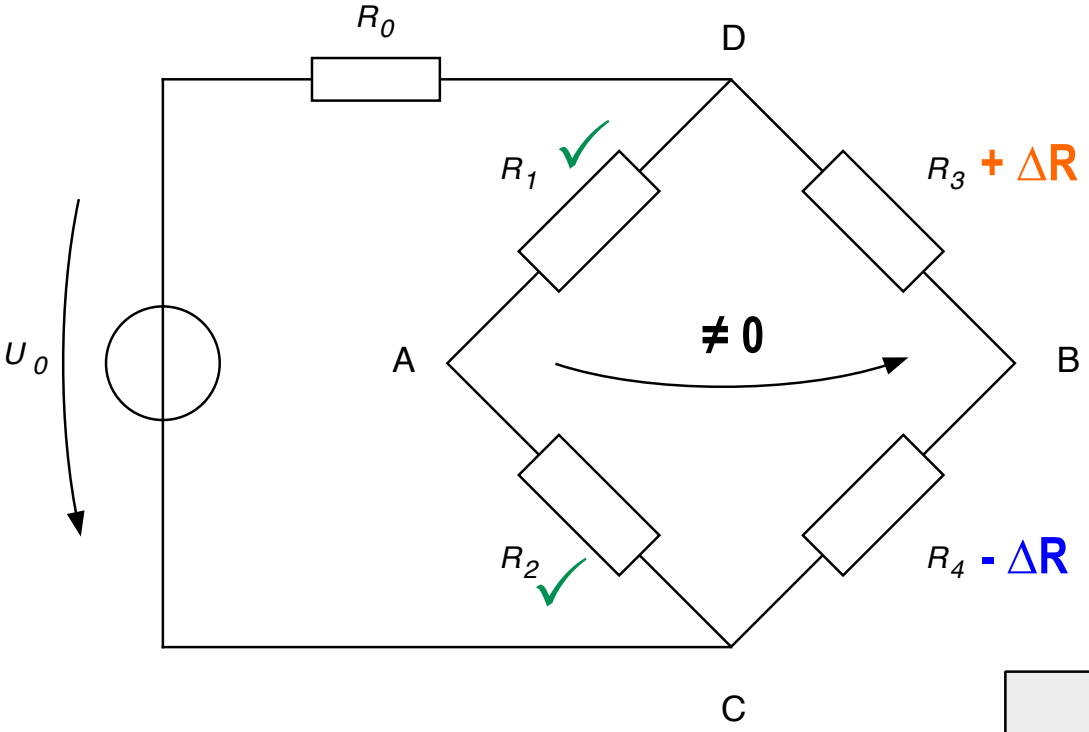
$$R = \rho \cdot \frac{L}{S}$$



Exemple d'application 2 – Déformation



Exemple d'application 2 – Mesure du déséquilibre



$$V_{mes} = V_{DC}\left(\frac{R_4 - \Delta R}{(R_3 + \Delta R) + (R_4 - \Delta R)} - \frac{R_2}{R_1 + R_2}\right)$$

CONCLUSIONS

- Circuit particulier – Associé à la métrologie
- En régime continu et alternatif
- Peut être utilisé de deux manières
- Présente des avantages