Enquiry into Iterative schemes

A Brief Review

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OUTLINE

1. INTRODUCTION

why not row reduction?

Why do we need Iterative methods?
we already have row-reduction,cramer's rule and solution using inverse at our disposal!?
Compuatational complexity of Gauss-elimination is $\mathrm{O}(\mathrm{n}^3)$

2. HEURISTICS

Why is the only

- **AIM :** To determine an unknown low resistance using the Carey Foster's bridge.
- **APPARATUS USED :** Carey foster's bridge, unknown low resistance,Resistance box, Battery, jockey, one way key, Galvanometer,small shunt resistance, connecting wires of almost zero resistance.

THEORY

X is the unknown resistance. P,Q and Y are known resistances of magnitude comparable to that of X, forming the other half of the bridge. The bridge wire EF has a jockey contact D placed along it and is slid until the galvanometer G measures zero. The thick-bordered areas are thick copper busbars of almost zero resistance.
The bridge is said to be balanced when no current passes through the galvanometer.

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and add 1 to each side:

$$\frac{P}{Q} + 1 = \frac{X + Y + \sigma(100 + \alpha + \beta)}{X + \sigma(100 - \ell_2 + \beta)} \tag{1}$$

From (1) and (2) we get:

$$Y + \sigma(100 - \ell_1 + \beta) = X + \sigma(100 - \ell_2 + \beta)$$

$$\implies X = Y + \sigma(\ell_2 - \ell_1) \tag{2}$$

Subtleties of Modification

- Note that the unknown unwanted resistances α and β have no affect on the finally obtained resistance X. This reduces the error in the result to a great extent. This boosts the sensitivity of the instrument
- Comparing this to a metre bridge, This setup ensures that the components of the circuit are not majorly harmed incase the unknown resistance is very small.
- This enables more accurate measurements of smaller resistances.

PROCEDURE

To find the unknown resistance(X)

1. Setup the circuit as shown in figure **??**
2. Start by switching on the circuit and sliding the galvanometer jockey ubtil the deflections become very small.
3. Now remove the shunt resistance and search for null point in the region of minimal deflection.
4. Once the null point is found, measure EF.
5. Swap X and Y and repeat the above steps to get ℓ_2.
6. Repeat 1,2,3 qnd 4 with different values of Y.

To find the resistance per unit length (σ)

1. Setup the circuit as shown in circuit diagram but now replace X with a wire of zero resistance.

3. REFERENCES

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