Thevenin's theorem -

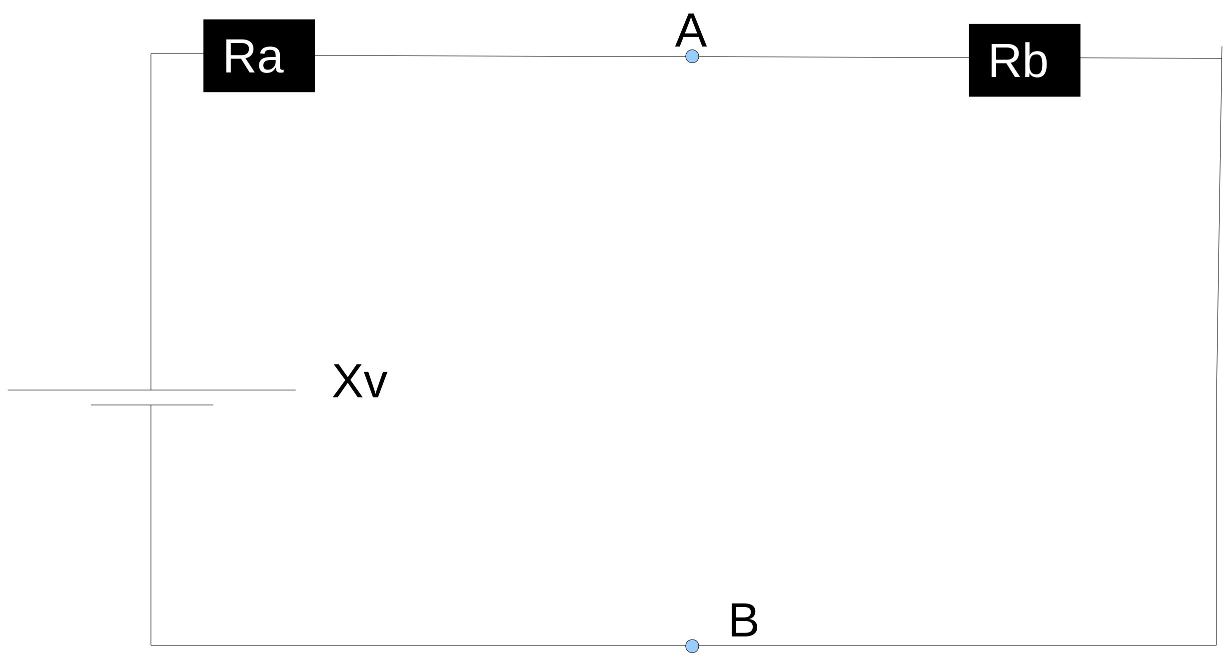


Fig. a

Deriving potential difference between points A and B -

Total I = $\frac{V}{R}=\frac{Xv}{Ra+Rb}$

V across Ra = $I_{total}Ra$

Potent across Rb = potential across A and B.

Potential across Rb = $Xv-I_{total}Ra$

= $Xv-\frac{Xv}{Ra+Rb}Ra$

$Xv(1-\frac{1}{Ra+Rb}Ra)$

Resistance between A and B - $\frac{Ra.Rb}{Ra+Rb}$

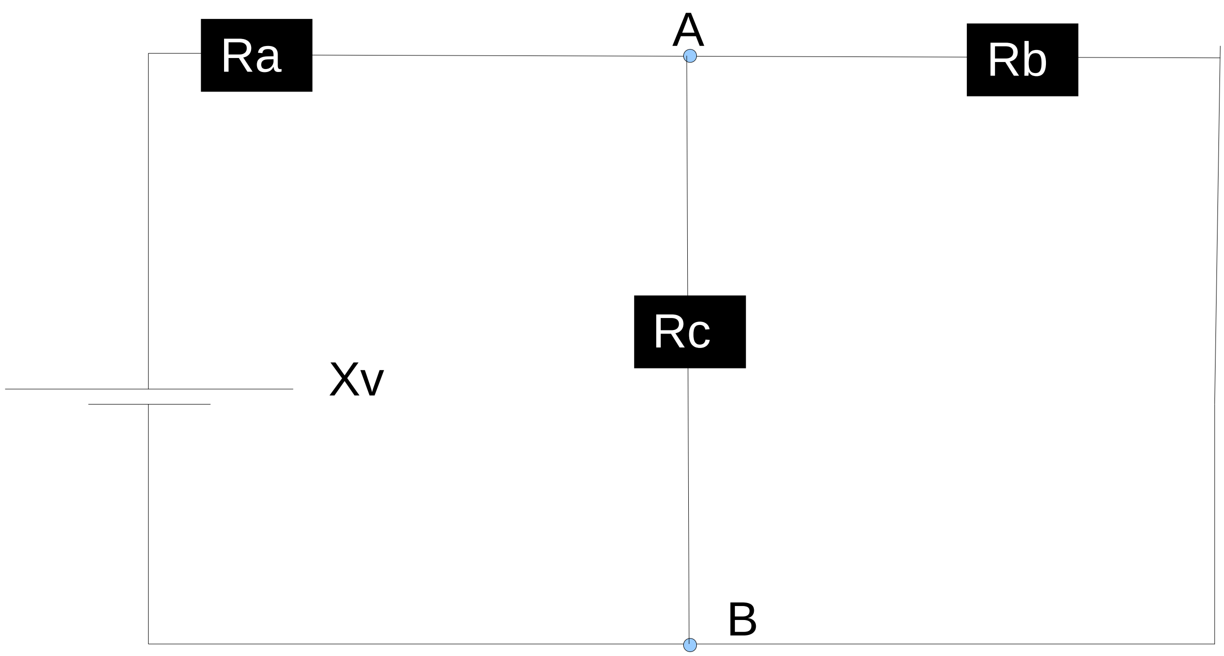


Fig. b

On adding the resistance Rc (as in the above image) -

Total I = $\frac{Xv}{\frac{Rc.Rb}{Rc+Rb}+Ra}$

V across Rb or Rc = $I_{total}\frac{Rc.Rb}{Rc+Rb}$ or $\frac{Xv}{\frac{Rc.Rb}{Rc+Rb}+Ra}\frac{Rc.Rb}{Rc+Rb}$

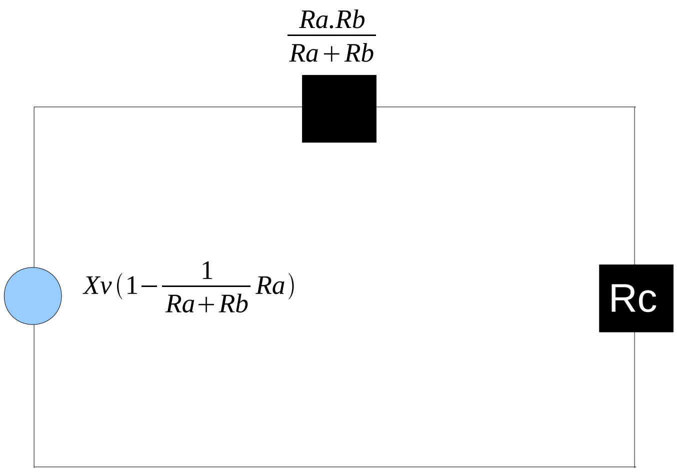
$$\frac{Xv.Rc.Rb}{(\frac{Rc.Rb}{Rc+Rb}+Ra)(Rc+Rb)}$$

$$\frac{Xv.Rc.Rb}{(\frac{Rc.Rb+(Rc+Rb)Ra}{Rc+Rb})(Rc+Rb)}$$

$$\frac{Xv.Rc.Rb}{(Rc.Rb+Ra.Rc+Rb.Ra)}$$

Connect this resistance in series to a voltage source equal to the rating of the potential difference between the 2 open points (as computed before, between A and B), and then, again in series, add Rc...or the load resistance.

The P.D that should come across Rc should be equal to as figured out in the derivations of figure B ($\frac{Xv.Rc.Rb}{(Rc.Rb+Ra.Rc+Rb.Ra)}$)



As you would have assumed, that blue thing is the voltage source.

Total resistance = $\frac{Ra.Rb}{Ra+Rb}+Rc$

The total current in this case will be -

$$i=\frac{Xv(1-\frac{1}{Ra+Rb}Ra)}{\frac{Ra.Rb}{Ra+Rb}+Rc}$$

So $V_{Rc}=(\frac{Xv(1-\frac{1}{Ra+Rb}Ra)}{\frac{Ra.Rb}{Ra+Rb}+Rc})(\frac{Ra.Rb}{Ra+Rb}+Rc)$

$$V_{Rc}=Xv(1-\frac{1}{Ra+Rb}Ra)$$

Which does not appear to be equal to $\frac{Xv.Rc.Rb}{(Rc.Rb+Ra.Rc+Rb.Ra)}$