BJT Bias

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02/25/2012

Please send corrections (or suggestions) to youngwlim@hotmail.com.

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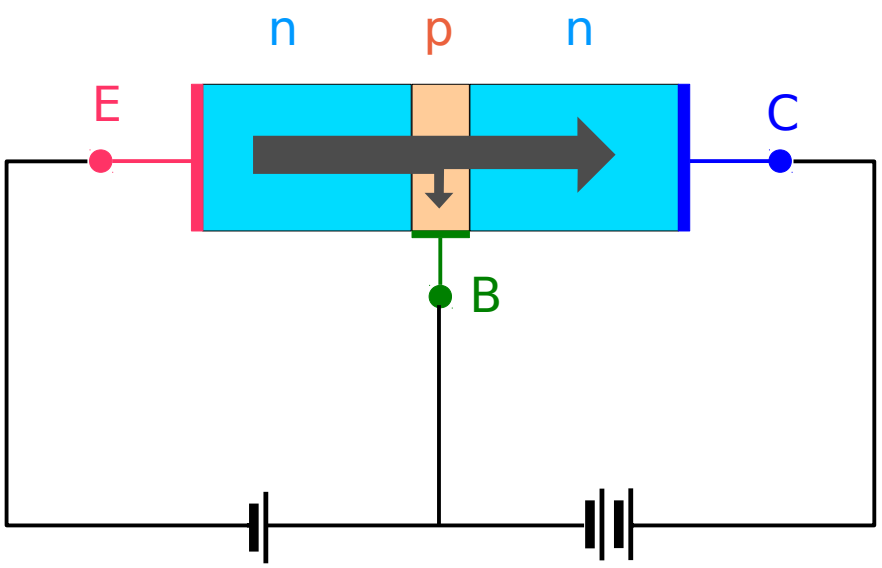
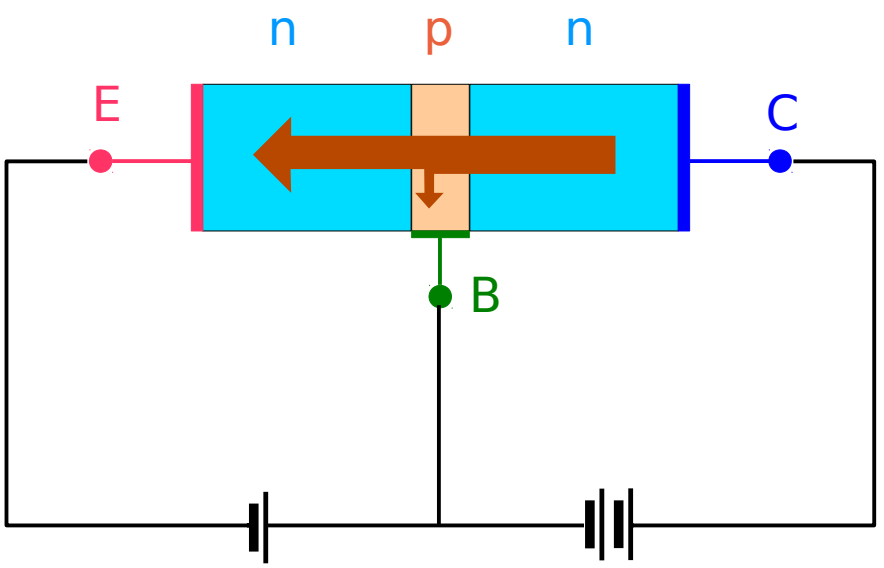
02/25/2012

Common Base (1)

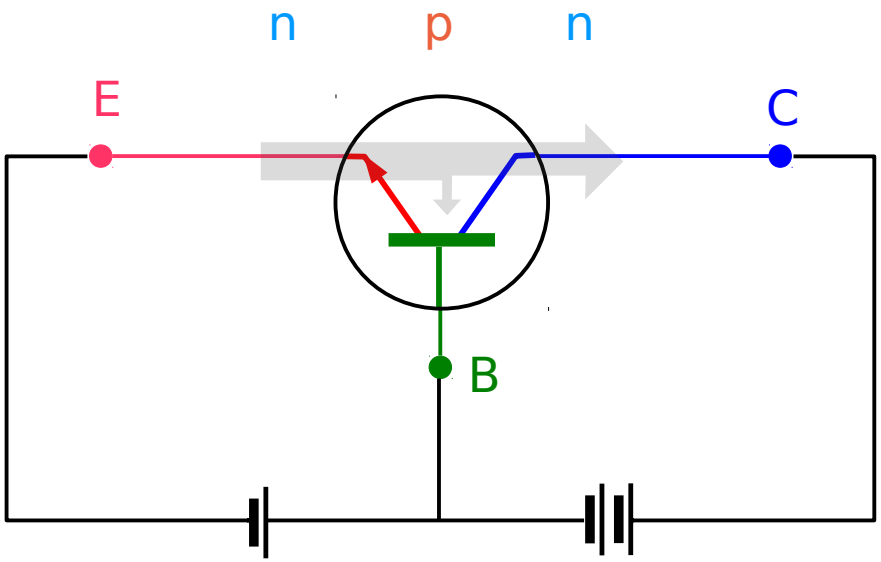


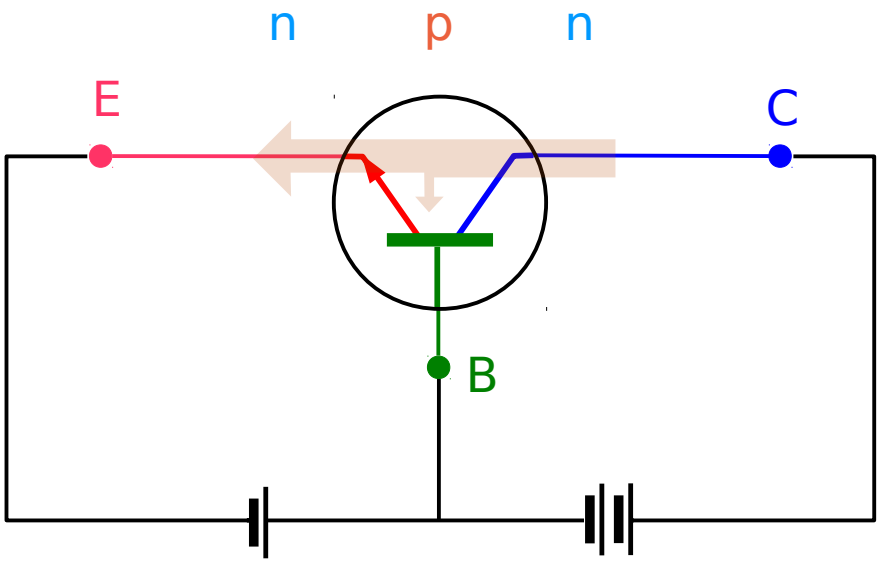


Electron Flow

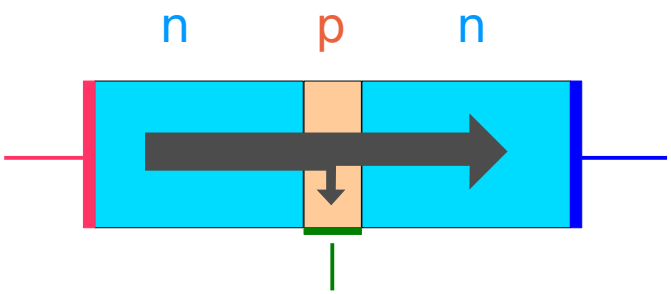
Current Flow

Common Base (2)

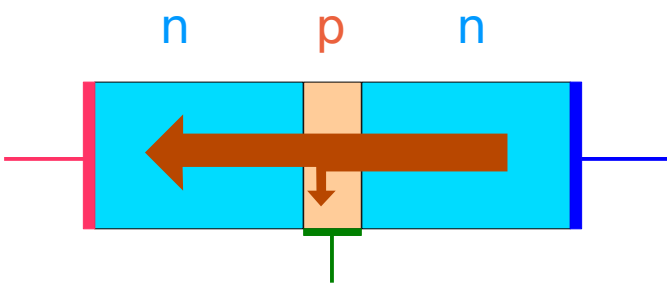




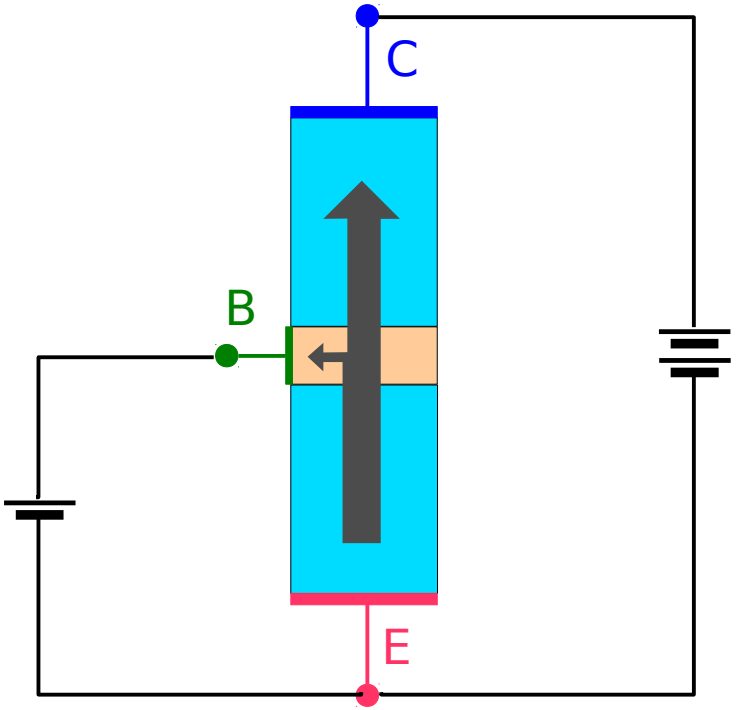
Electron Flow



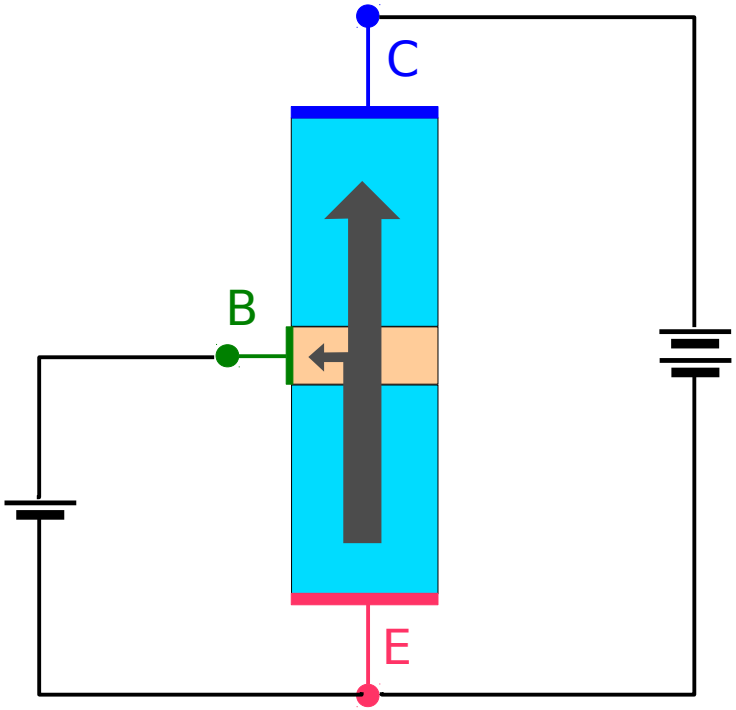
Current Flow



Common Emitter (1)

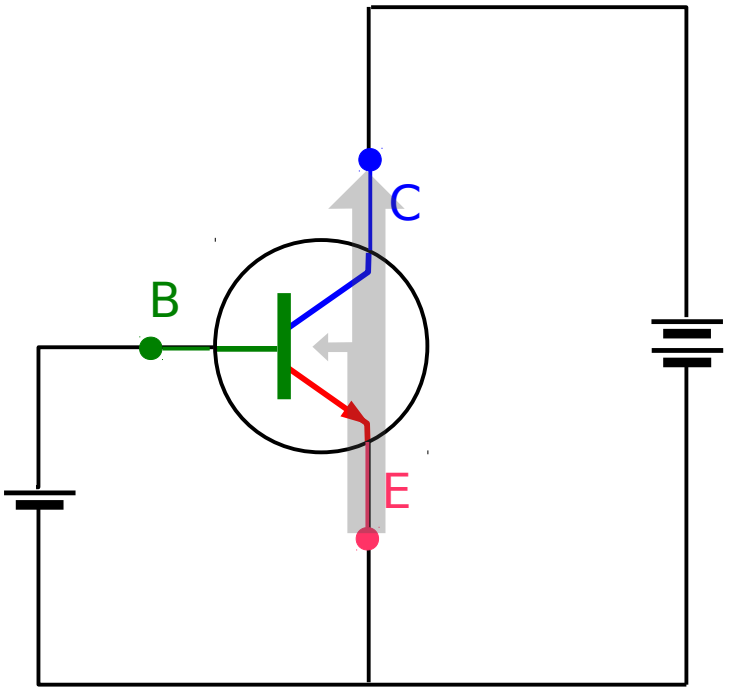


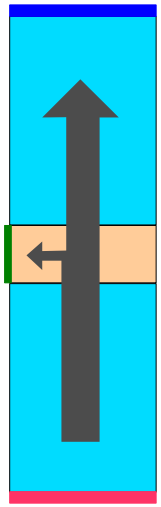
Electron Flow



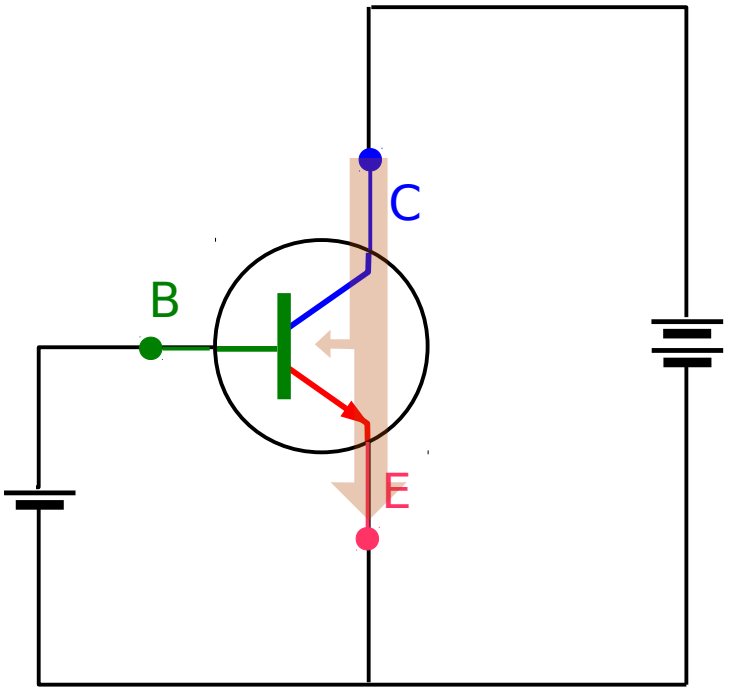
Current Flow

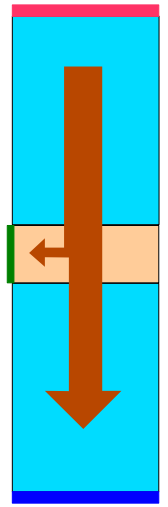
Common Emitter (2)





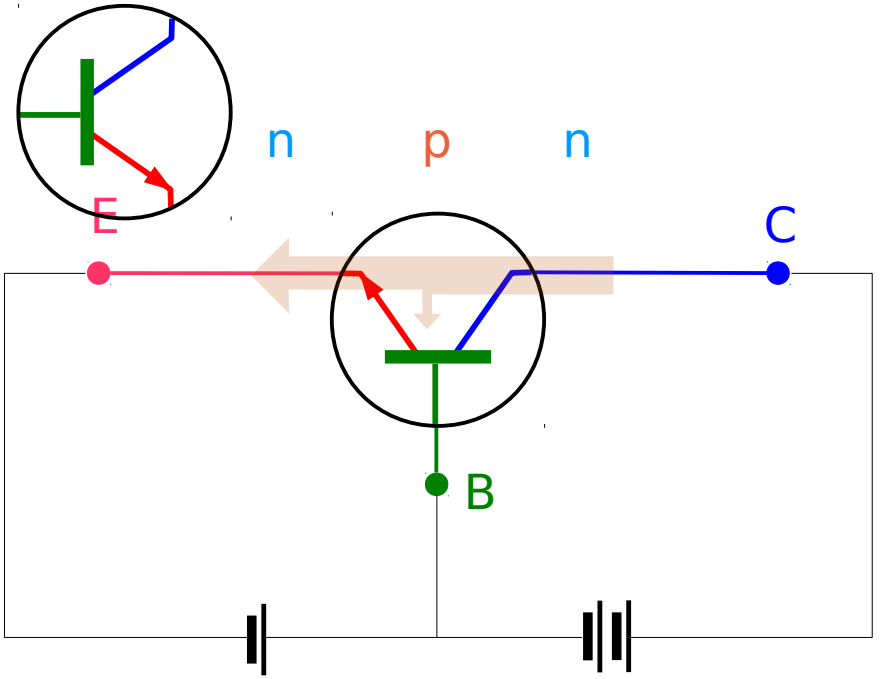
Electron Flow



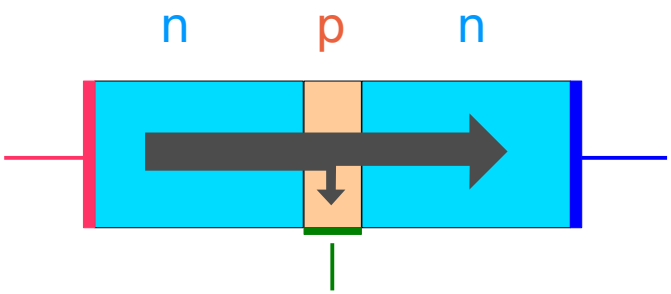


Current Flow

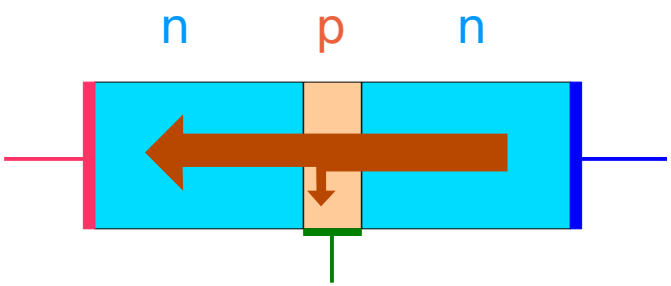
Common Emitter (2)



Electron Flow

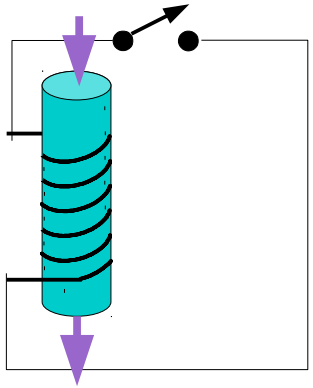


Current Flow

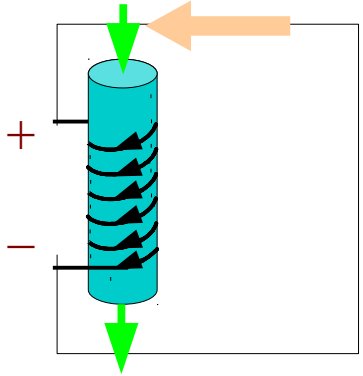


Maintain Magnetic Field

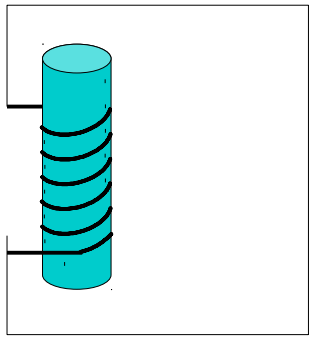
Before



Initial



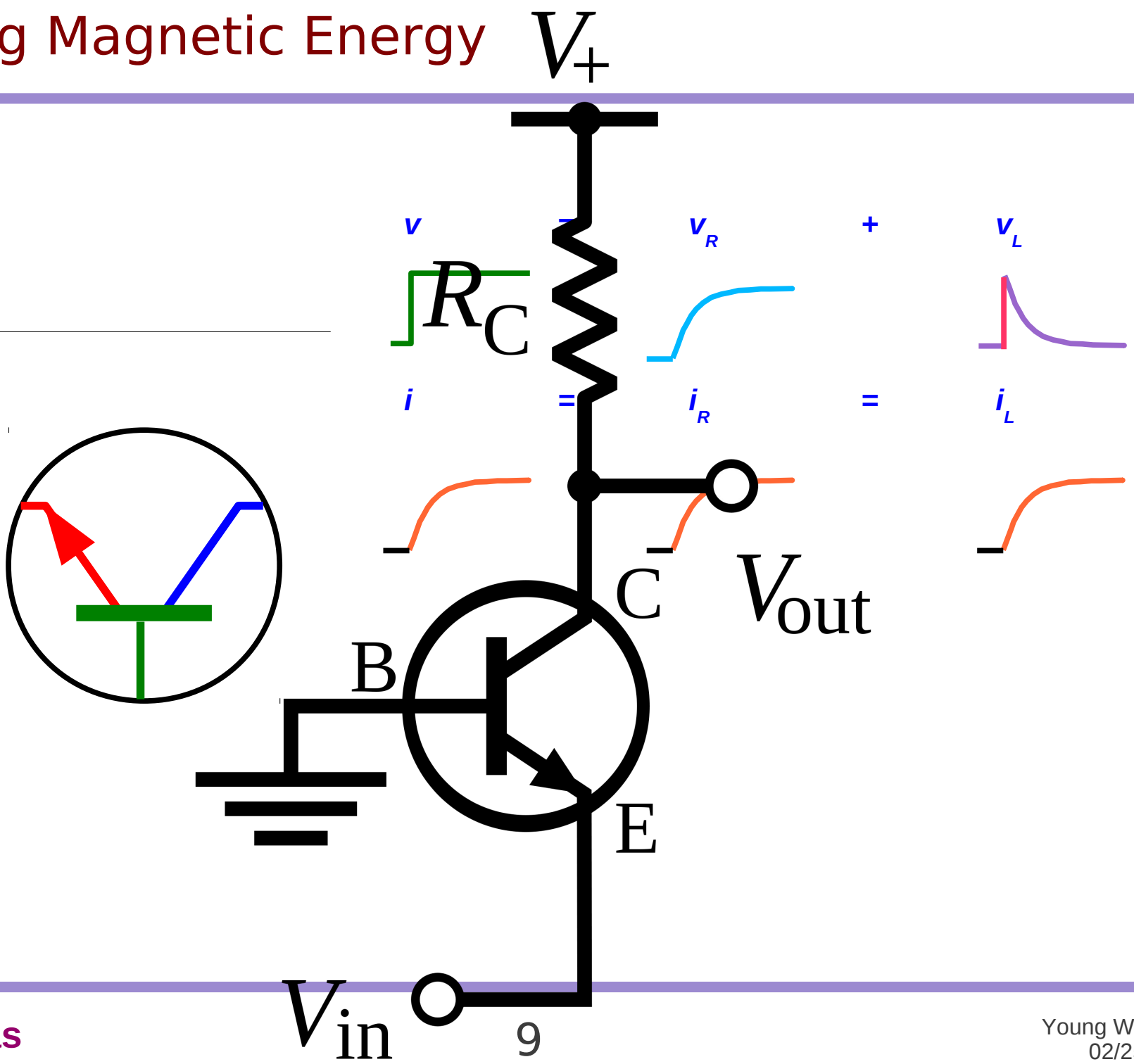
Final



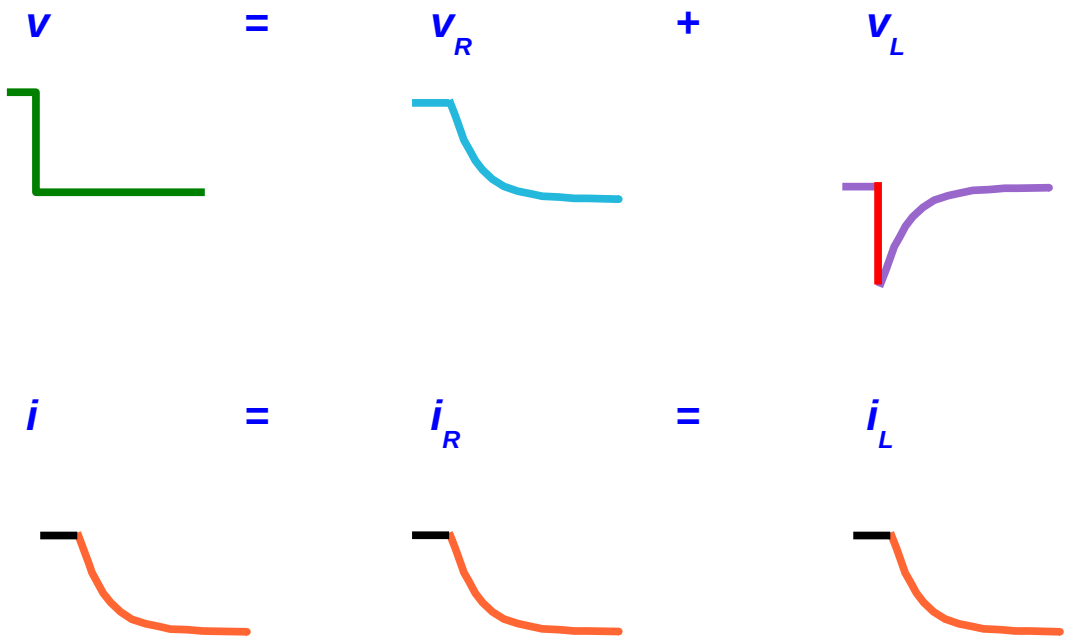
No Energy in magnetic field

Induced EMF

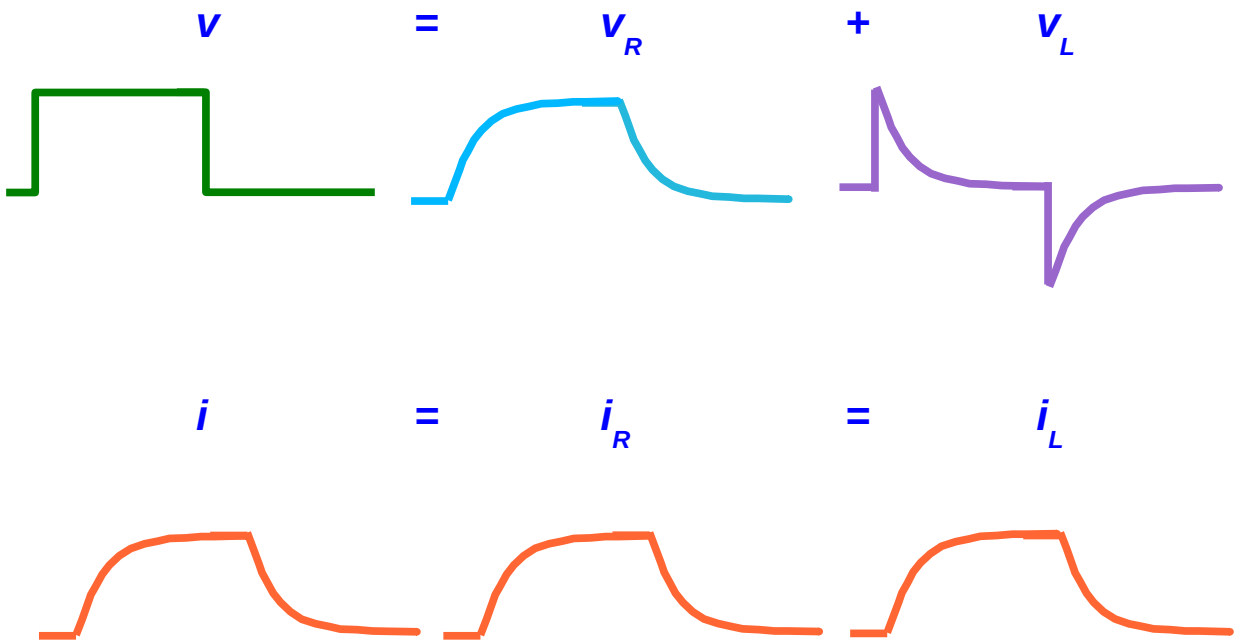
Storing Magnetic Energy



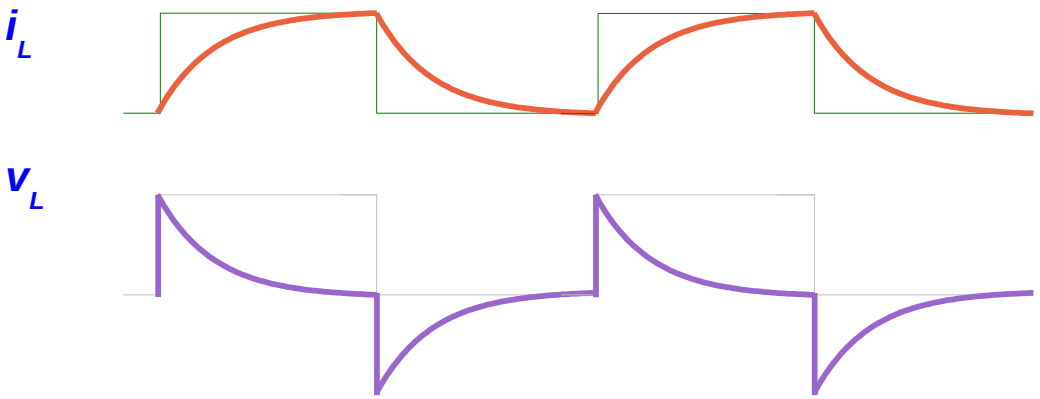
Dissipate Magnetic Energy



Pulse

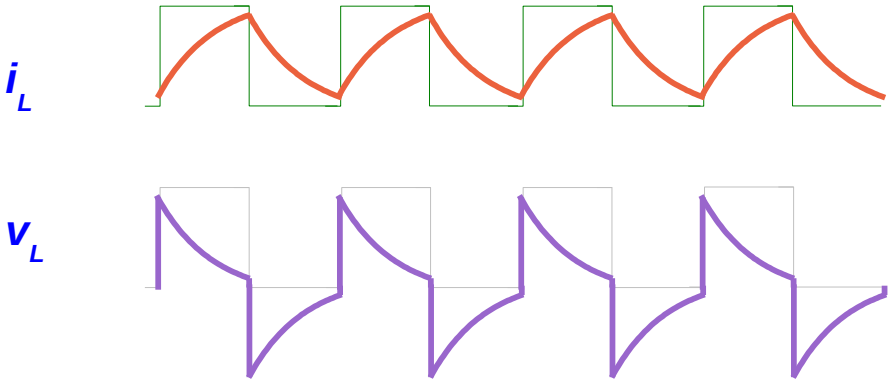


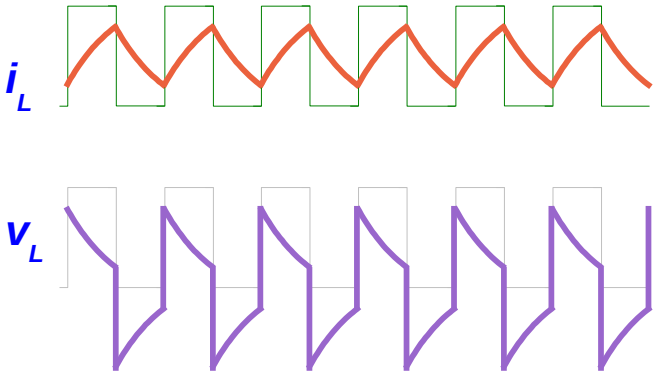
Pulse



$$v_L = L \frac{d\, i_L}{d\, t}$$

ω ↑ v_L ↓ X_L ↑





Phasor

Sinusoid (Sine Waves)

$$A\cos(\omega t + \theta)$$

- ***Amplitude*** A
- ***Angular Frequency*** ω
- ***Angular Frequency*** θ

1. Representation using Euler's Formula

$$A\cos(\omega t + \theta) = \frac{A}{2}\cdot e^{+i(\omega t+\theta)} + \frac{A}{2}\cdot e^{-i(\omega t+\theta)}$$

2. Representation using Real Part

$$A\cos(\omega t + \theta) = Re\{A e^{i(\omega t + \theta)}\} = Re\{A e^{i\theta}\cdot e^{i\omega t}\}$$

$$\Rightarrow A e^{i\theta}\cdot e^{i\omega t}$$

$$\Rightarrow A e^{i\theta}$$

$$\Rightarrow A\angle\theta$$

Phase Lags and Leads

$$\frac{d}{dx} f(x) = \cos(x) \quad \textbf{leads} \quad f(x) = \sin(x)$$

$$\frac{d}{dx} f(x) = -\sin(x) \quad \textbf{leads} \quad f(x) = \cos(x)$$

$$\int f(x)\,dx = -\cos(x) + C \quad \textbf{lags} \quad f(x) = \sin(x)$$

$$\int f(x)\,dx = \sin(x) + C \quad \textbf{lags} \quad f(x) = \cos(x)$$

$$\frac{d}{dx} f(x) \quad \textbf{leads} \quad f(x) \quad \textbf{by} \quad \frac{\pi}{2}$$

$$\int f(x)\,dx \quad \textbf{lags} \quad f(x) \quad \textbf{by} \quad \frac{\pi}{2}$$

References

[1] http://en.wikipedia.org/
[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003