**Appendix Useful Formulae**

1. Power
2. Resistance transformation: Wye to Delta () connection (R31, R12, R23 is delta equivalent resistance)
3. Superposition Theorem: We consider one independent source at a time while all other independent sources are *turned off*. This implies that we replace every **voltage source by 0 V (or a short circuit)**, and every **current source by 0 A (or an open circuit)**.
4. The voltage on a capacitor **cannot change abruptly**. The current through an inductor **cannot change instantaneously**.
5. The **complete response** can be written as

Thus, to find the step response of an RC circuit requires three things:

1. The initial capacitor voltage
2. The final capacitor voltage
3. The time constant t
4. A typical sine voltage waveform can be expressed as, V,

The angular frequency: ω = 2πf.

1. RMS Voltage: Vrms = 0.707 Vmax
2. Impedance of capacitor and inductor:
3. As a complex quantity, the impedance may be expressed in rectangular form as

Or

Where