Series Circuit Characteristics

The following is a list of the characteristics of the series circuit.

1. The current is the same everywhere in the circuit. This means that wherever I try to measure the current, I will obtain the same reading.
2. Each component has an individual Ohm's law Voltage Drop. This means that I can calculate the voltage using Ohm's Law if I know the current through the component and the resistance.
3. Kirchoff's Voltage Law Applies. This means that the sum of all the voltage sources is equal to the sum of all the voltage drops or
   \[ V_s = V_1 + V_2 + V_3 + \ldots + V_N \]
4. The total resistance in the circuit is equal to the sum of the individual resistances.
   \[ R_T = R_1 + R_2 + R_3 + \ldots + R_N \]
5. The sum of the power supplied by the source is equal to the sum of the power dissipated in the components.
   \[ P_T = P_1 + P_2 + P_3 + \ldots + P_N \]

Parallel Circuit Characteristics

The following is a list of the characteristics of the parallel circuit.

1. The current in each component (branch) is the same everywhere in the circuit. This means that wherever I try to measure the voltage, I will obtain the same reading, and this is the supply voltage.
2. Each branch has an individual current path. I can calculate the current using Ohm's Law if I know the voltage across the component and the resistance.
3. Kirchoff's Current Law Applies. This means that the sum of all the voltage sources is equal to the sum of all the voltage drops or
   \[ I_T = I_1 + I_2 + I_3 + \ldots + I_N \]
4. The total resistance in the circuit is equal to inverse the sum of the inverse of the individual resistances.
   \[ \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots + \frac{1}{R_N} \]
5. The sum of the power supplied by the source is equal to the sum of the power dissipated in the components.
   \[ P_T = P_1 + P_2 + P_3 + \ldots + P_N \]