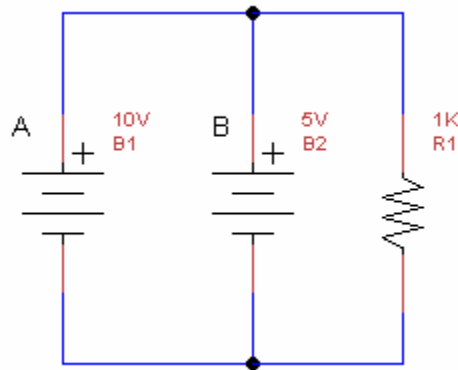


# Two voltage sources in parallel

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When two voltage sources are kept in parallel to each other having different voltage rating, a strange response will occur. An example circuit is given:



Simulation programs like SPICE can't solve this circuit and displays a 'singular matrix error'. There are two points A and B marked in the figure. Now when the battery is connected to the circuit, the potential at point A is 10V and potential at point B is 5V. Then the potential difference between A and B is 5V. Since A and B are connected together, a current  $5/R$  will pass from A to B where R is the resistance of the copper wire connected from A to B. But the resistance of a copper wire is very small. Thus a very large current will pass through the circuit and cause the destruction of the battery. Since SPICE consider the resistance offered by the copper conductor wire is zero normally. Thus it calculates current as infinity which causes an error message. A negligibly small resistor in the SPICE netlist may fix the problem. This type of circuit is rarely used and can be replaced by other equivalent circuits.

In the case batteries having same voltage rating, don't bother about this problem, because the potential at A and B are forced to be same.