# Electrical Circuits

See the image of a passive electrical circuit below. Write a function called **voltage** that computes the voltages at junctions A, B and C. The function has two inputs, V for the voltage of the supply in volts and R, a vector of the values of the resistors in ohm. $R_1$ in the figure is R(1), that is, the first element of the vector R. In general, $R_N$ is R(N). The output of the function is a three-element column vector with the voltage levels at junctions A, B and C, respectively.

To compute the voltage levels, we can use Kirchhoff's first law that states that the sum of current flowing in and out of a junction must be zero. So, for example, here is the equation for junction A:

$$\frac{V-A}{R_1}-\frac{A-B}{R_7}-\frac{A}{R_2}=0$$

The current across a resistor is the voltage difference divided by the resistance, i.e, $i_N=\frac{V_{in}-V_{out}}{R_N}$. You have to be careful that you use the correct sign for inflow and outflow. In the above equation, we assumed that $A>B$, so the current flows out, hence, the negative sign. But if the assumption was wrong, that will still work since $A-B$ will then be negative, so overall, it will turn into a positive inflow value.

You need to write the remaining two equations for junctions B and C and rearrange the equations to get the canonical form so that we can use MATLAB's support for solving linear equations.

Good values to check your function with:

- $R_1=0$ means that A must be at V level. Same for $R_3$ and $R_5$ for B and C, respectively.
- $R_2=0$ makes $A=0$. Same for $R_4$ and $R_6$ for B and C, respectively.
- If $\frac{R_1}{R_2}=\frac{R_3}{R_4}=\frac{R_5}{R_6}$ then A,B and C will be at the same level independent of $R_7$ and $R_8$.