

**DEF:** A node is any set of wires connected directly to each other

**DEF:** An essential or extraordinary node is any node with three or more distinct currents flowing out of it.

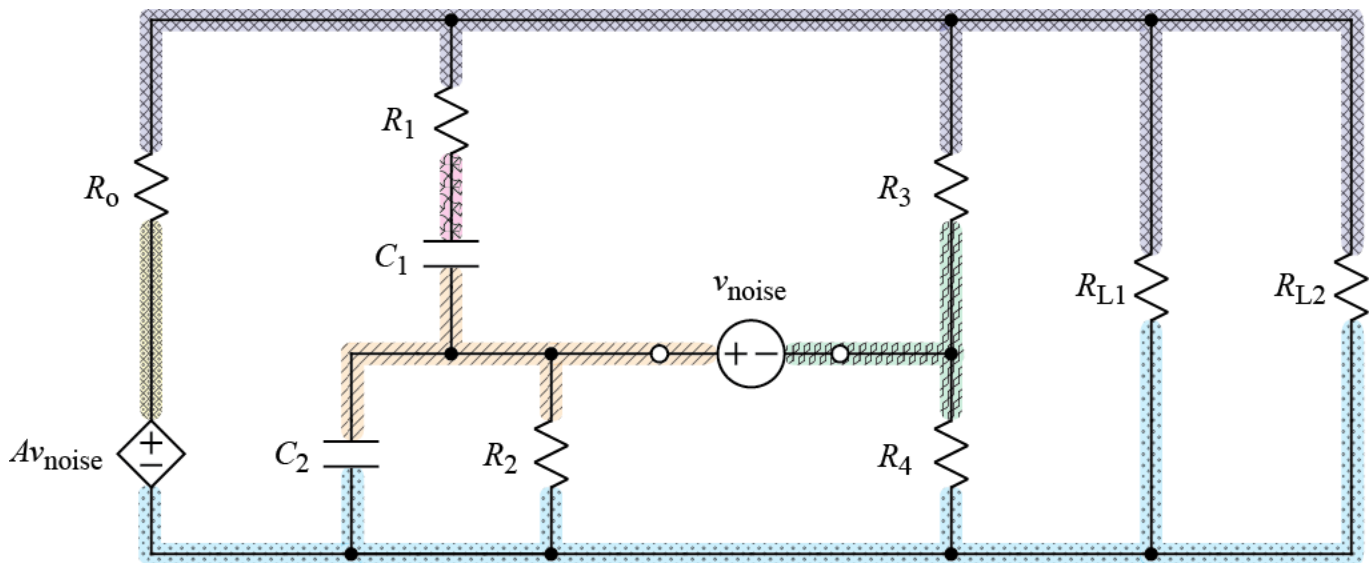
**TOOL:** Use different colors (after deleting dangling wires) to mark nodes.

**NOTE:** A dangling wire that is connected only at one end may be deleted when finding essential nodes since zero current flows in a wire that leads to an open circuit.

**TOOL:** Circuit elements are in parallel when they are connected to the same color of node at one end and are connected to the same color of node at the other end.

**TOOL:** Circuit elements are in series when they are connected to the two ends of the same non-essential node.

**EX:** The nodes have been colored in the circuit below.



All the nodes except the wire between  $R_0$  and  $A v_{\text{noise}}$  and the wire between  $R_1$  and  $C_1$  are essential nodes.

As shown in the schematic below,  $C_2$  and  $R_2$  are in parallel (as they share an orange node on top and a blue node on bottom).  $R_{L1}$  and  $R_{L2}$  are in parallel (as they share a purple node on top and a blue node on bottom).

