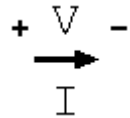## Lecture 6, Wednesday, January 26, 2022
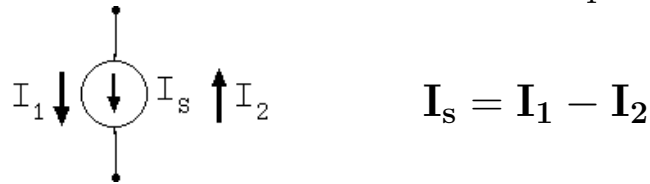
- Loop-current method

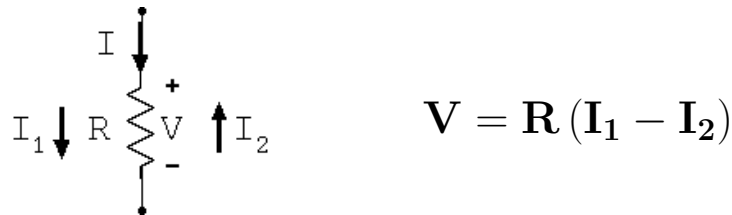 1. Assign loop currents I_1, I_2, ..., I_n.

  2. Assign current directions and polarities to all elements (use SRS for simplicity).

  3. Use Current sources to obtain equations between their loop currents.

        $I_s = I_1 - I_2$

  4. Use KVL on remaining loops to get a total of $\mathbf{n}$ equations in terms of the loop currents.

        $V = R(I_1 - I_2)$

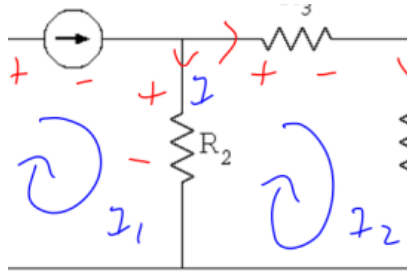 5. Solve equations.

  * Superloop: combine loops involved in a current source into a single *superloop*, bypassing the current source. This avoids introducing an additional variable for the voltage at the current source.

     continued on next page....

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- There is a difference between *branch* currents, and *loop* currents:

  - branch currents are currents through elements and branches (elements in series),

  - loop currents go through loops across multiple elements and branches.

  - In the figure below, the branch current is the net current I through the resistor in the direction of the arrow (down)

    * It is composed of two loop currents: I_1 and I_2
    * loop current I_1 is going in the same direction as I
    * loop current I_2 is going in the opposite direction.
    * So, the branch current $I = I_1 - I_2$