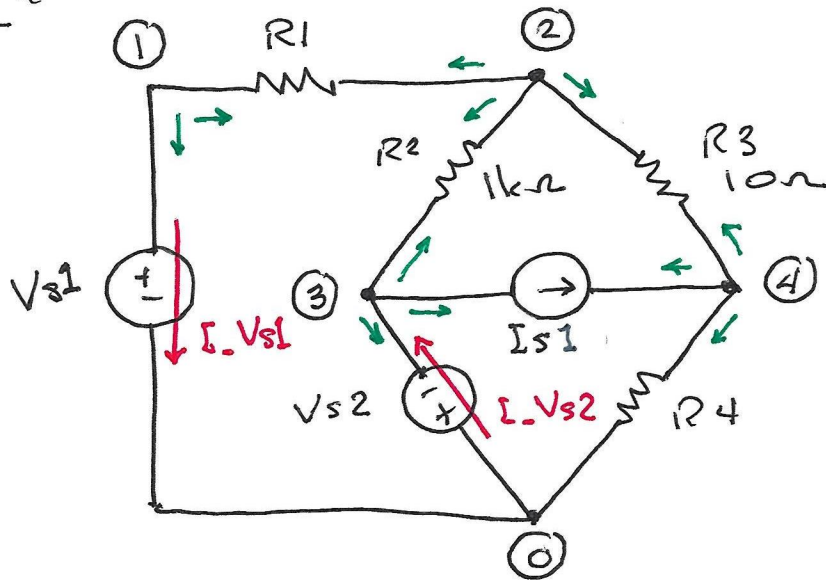


Modified Nodal Analysis

Example 1



4 KCL eqns.

$$\begin{aligned} \text{At node 1: } & \frac{v_1 - v_2}{R_1} + I_{Vs1} = 0 \\ \text{At node 2: } & \frac{v_2 - v_1}{R_1} + \frac{v_2 - v_3}{R_2} + \frac{v_2 - v_4}{R_3} = 0 \\ \text{At node 3: } & \frac{v_3 - v_2}{R_2} + I_{Is1} - I_{Vs2} = 0 \\ \text{At node 4: } & \frac{v_4 - v_2}{R_3} - I_{Is1} + \frac{v_4 - 0}{R_4} = 0 \end{aligned}$$

For V_{s1} : $v_2 = V_{s1}$ } voltage source constraints
 For V_{s2} : $-v_3 = V_{s2}$ }

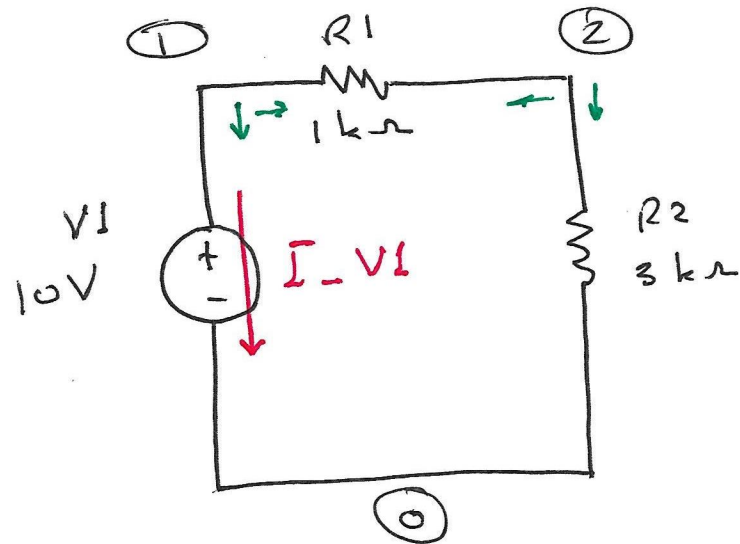
	v_1	v_2	v_3	v_4	$\sum -V_{s1}$	$\sum -V_{s2}$
node 1	$\frac{1}{R1}$	$-\frac{1}{R1}$			1	
node 2	$-\frac{1}{R1}$	$\frac{1}{R3} + \frac{1}{R1} + \frac{1}{R2}$	$-\frac{1}{R2}$	$-\frac{1}{R3}$		
node 3		$-\frac{1}{R2}$	$\frac{1}{R2}$			-1
node 4		$-\frac{1}{R3}$		$\frac{1}{R3} + \frac{1}{R4}$		
V_{s1}	1					
V_{s2}			-1			

v_1
v_2
v_3
v_4
$\sum -V_{s1}$
$\sum -V_{s2}$

0
0
$-\sum I_{s1}$
$\sum I_{s1}$
V_{s1}
V_{s2}

A
 x
 z

Example 2



KCL at node 1:

$$I_{-V1} + \frac{v_{-1} - v_{-2}}{R1} = 0$$

KCL at node 2:

$$\frac{v_{-2} - v_{-1}}{R1} + \frac{v_{-2}}{R2} = 0$$

V1 constraint:

$$v_{-1} = V1$$

Netlist for Example 1:

Vs1	1	0	Symbolic
R1	1	2	Symbolic
R2	3	2	1000 or 1E3
R3	2	4	10
Is1	3	4	Symbolic
Vs2	0	3	Symbolic
R4	4	0	Symbolic

new > script

type in the netlist

save as Example1.cir

close the script window

type in: frame = Example1.cir

ISSU - scan

