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Courses » Basic Electrical Circuits

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 6 - Week 4: Nodal analysis

Course outline

How to access the portal

Pre-requisite Assignment

Week 1: Preliminaries; Current and voltage; Electrical elements and circuits; Kirchhoff's laws; Basic elements; Linearity

Week 2: Elements in series and parallel; Controlled sources

Week 3: Power and energy in electrical elements; Circuit analysis methods

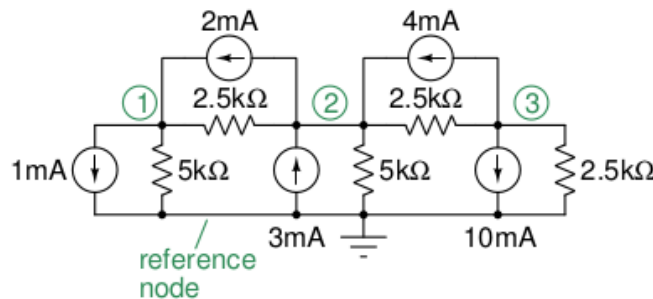
Week 4: Nodal analysis

- What is nodal analysis
- Setting up

Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2018-09-05, 23:59 IST.**

1)



Setup the nodal analysis equations for the circuit above. Enter the G matrix in the space provided below, one row on each line. A 3x3 identity matrix should be entered as

```
1 0 0
0 1 0
0 0 1
```

- Do not have any space at the start of the line
- Have exactly one space between entries on each row
- Do not have any space after the last entry in each row
- Do not have any trailing zeros, i.e. do not write 5.5 as 5.50 or 5.500

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nodal analysis formulation

- Completely solving the circuit starting from nodal analysis
- Nodal analysis example
- Matrix inversion basics
- Nodal analysis with independent voltage sources
- Supernode for nodal analysis with independent voltage sources
- Nodal analysis with VCCS
- Nodal analysis with VCVS
- Nodal analysis with CCVS
- Nodal analysis with CCCS
- Quiz : Assignment 4
- Week 4 - Feedback: Basic Electrical Circuits

Week 5 : Mesh analysis; Circuit theorems

Week 6: More circuit theorems; Two port parameters

Week 7: Two port parameters continued; Reciprocity in resistive networks

Week 8: Opamp and negative feedback; Example circuits and additional topics

Week 9 :First Order Circuits

Week 10 : First

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Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 0.6 -0.4 0;-0.4 1 -0.4;0 -0.4 0.8

1 point

2) Determine the voltage at node 3 in the circuit above.

(The answer must be in the **volts (V)**. Round off fractional answers to two decimal place.)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) -18.8,-18.7

1 point

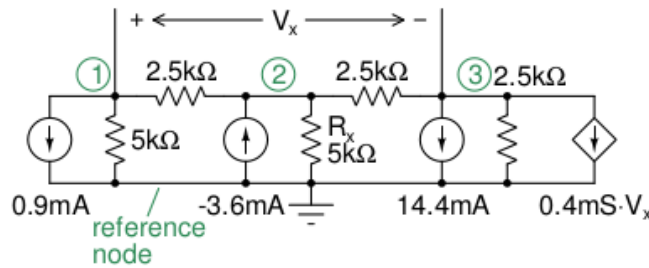
3)

order circuits with time-varying inputs

Week 11: Second order system response

Week 12: Direct calculation of steady state response from equivalent components

Video Download



Setup the nodal analysis equations for the circuit above. Enter the G matrix in the space provided below, one row on each line. A 3x3 identity matrix should be entered as

```
1 0 0
0 1 0
0 0 1
```

- Do not have any space at the start of the line
- Have exactly one space between entries on each row
- Do not have any space after the last entry in each row
- Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The $[G]$ matrix entries should be in **millisiemens (mS)**. Round off fractional answers to one decimal place.)

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 0.6 -0.4 0;-0.4 1 -0.4;0.4 -0.4 0.4

1 point

4) Determine the power dissipated in the resistor R_x in the circuit above.

(The answer must be in **milliwatts (mW)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.

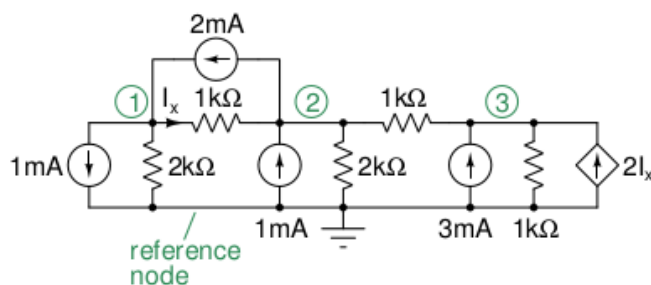
Score: 0

Accepted Answers:

(Type: Numeric) 180

1 point

5)



Setup the nodal analysis equations for the circuit above. Enter the G matrix in the space provided below, one row on each line. A 3×3 identity matrix should be entered as

1 0 0

0 1 0

0 0 1

- Do not have any space at the start of the line
- Have exactly one space between entries on each row
- Do not have any space after the last entry in each row
- Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The $[G]$ matrix entries should be in **millisiemens (mS)**. Round off fractional answers to one decimal place.)

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 1.5 -1 0;-1 2.5 -1;-2 1 2

1 point

6)

Determine the voltage at node 3 in the circuit above.

(The answer must be in the **volts (V)**. Round off fractional answers to two decimal place.)

No, the answer is incorrect.

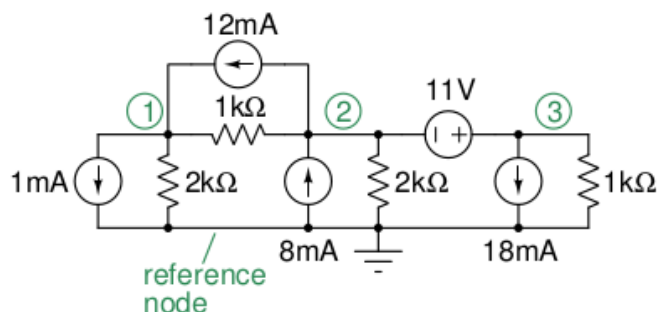
Score: 0

Accepted Answers:

(Type: Range) 2.3,2.4

1 point

7)



Setup the nodal analysis equations for the circuit above. Enter the G matrix in the space provided below, one row on each line. Have the equations in the following order: node equation, supernode equation, voltage source equation. A 3×3 identity matrix should be entered as

1 0 0

0 1 0

0 0 1

- Do not have any space at the start of the line
- Have exactly one space between entries on each row
- Do not have any space after the last entry in each row
- Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The $[G]$ matrix entries should be in **millisiemens (mS)** if they are conductances or scalars as applicable. Round off fractional answers to one decimal place.)

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 1.5 -1 0;-1 1.5 1;0 -1 1

1 point

- 8) Determine the voltage at node 2 in the circuit above. (You have already setup the nodal analysis equation for this circuit in the previous question. But, the $[G]$ matrix has conductances and dimensionless numbers. Be careful while inverting the matrix!).

(The answer must be in volts (V). Round off fractional answers to one decimal place.)

No, the answer is incorrect.

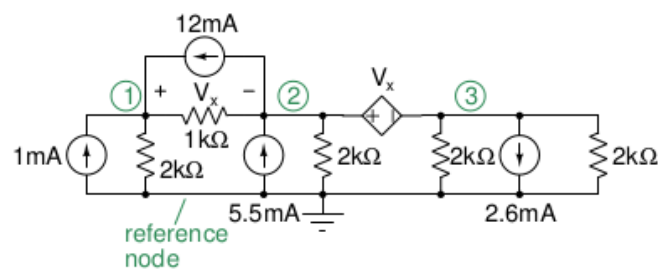
Score: 0

Accepted Answers:

(Type: Numeric) -14

1 point

- 9)



Setup the nodal analysis equations for the circuit above. Enter the G matrix in the space provided below, one row on each line. Have the equations in the following order: node equation, supernode equation, voltage source equation. A 3×3 identity matrix should be entered as

```
1 0 0
0 1 0
0 0 1
```

- Do not have any space at the start of the line
- Have exactly one space between entries on each row
- Do not have any space after the last entry in each row
- Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The $[G]$ matrix entries should be in millisiemens (mS) if they are conductances or scalars as applicable. Round off fractional answers to one decimal place.)

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 1.5 -1 0;-1 1.5 1;1 -2 1

(Type: String) 1.5 -1 0;-1 1.5 1;-1 2 -1

1 point

- 10 Determine the voltage at node 1 in the circuit above. (You have already setup the nodal analysis equation for this circuit in the previous question. But, the $[G]$ matrix has conductances and dimensionless numbers. Be careful while inverting the matrix!).

(The answer must be in volts (V). Round off fractional answers to one decimal place.)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 11.2

1 point

Previous Page

End