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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Basic Electrical Circuits (course)

Announcements (announcements) About the Course (preview) Ask a Question (forum) Progress (student/home) Mentor (student/mentor)

Unit 9 - Week 7: Two port parameters continued; Reciprocity in resistive networks

Course outline

How does an NPTEL online course work?

Week 0

Week 1: Preliminaries; Current and voltage; Electrical elements and circuits; Kirchoff'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

Week 5 : Mesh analysis; Circuit theorems

Week 6: More circuit theorems; Two port parameters

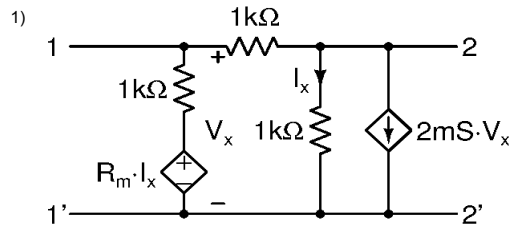
Week 7: Two port parameters continued; Reciprocity in resistive networks

- z parameters (unit? unit=19&lesson=105)
- z parameters: Examples (unit?unit=19&lesson=106)
- h parameters (unit? unit=19&lesson=107)
- h parameters: Examples (unit?unit=19&lesson=108)
- g parameters (unit? unit=19&lesson=110)
- g parameters: Examples (unit?unit=19&lesson=111)
- Calculations with a two-port element (unit? unit=19&lesson=112)
- Calculations with a two-port element (unit? unit=19&lesson=113)
- Degenerate cases (unit? unit=19&lesson=114)
- Relationships between different two-port parameters (unit?unit=19&lesson=115)

Assignment 7

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-11-04, 23:59 IST.



The two-port network in the figure above is reciprocal. Determine R_m .

(The answer must be in kilohms ($k\Omega$). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -2.2,-1.8

1 point

2)

With R_m chosen such that the two-port network in the figure above is reciprocal, determine the h-parameters of the circuit above.

$$[h] = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix}$$

where, h_{11} is in kilohms($k\Omega$), h_{22} is in millisiemens(mS), and h_{12} , h_{21} are scalars.

e.g If you get 1st row and 1st column of $[h]$ as $-1 k\Omega$, then $h_{11} = -1$.

The answer is the value of the expression given below:

$$(h_{11} \times h_{22}) + (h_{12} \times h_{21})$$

(Round off fractional answers to one decimal place.)

- Equivalent circuit representation for two ports (unit?unit=19&lesson=116)
- Reciprocity (unit?unit=19&lesson=117)
- Proof of reciprocity of resistive two-ports (unit?unit=19&lesson=118)
- Proof for 4-terminal two-ports (unit?unit=19&lesson=122)
- Reciprocity in terms of different two-port parameters (unit?unit=19&lesson=119)
- Reciprocity in circuits containing controlled sources (unit?unit=19&lesson=120)
- Examples (unit?unit=19&lesson=121)
- Week 7 Lecture Material (unit?unit=19&lesson=192)
- Basic Electrical Circuits : Week 7 Feedback Form (unit?unit=19&lesson=200)
- Quiz : Assignment 7 (assessment?name=219)
- Assignment 7 solutions (unit?unit=19&lesson=223)

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

Week 9 :First Order Circuits

Week 10 : First order circuits with time-varying inputs

Week 11: Second order system response

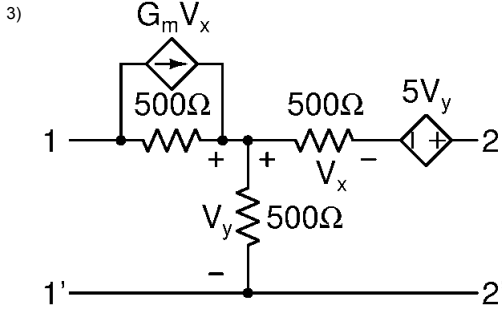
Week 12: Direct calculation of steady state response from equivalent components

Text Transcripts

Download Videos

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.4,0.6

1 point



The two-port network in the figure above is reciprocal. Determine G_m .

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 9.8,10.2

1 point

4) With G_m chosen such that the two-port network in the figure above is reciprocal, determine the g-parameters of the circuit above.

$$[g] = \begin{bmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{bmatrix}$$

where, g_{11} is in millisiemens (mS), g_{22} is in kilohms (kΩ), and g_{12} , g_{21} are scalars.

e.g If you get 1st row and 1st column of $[g]$ as -1 mS, then $g_{11} = -1$.

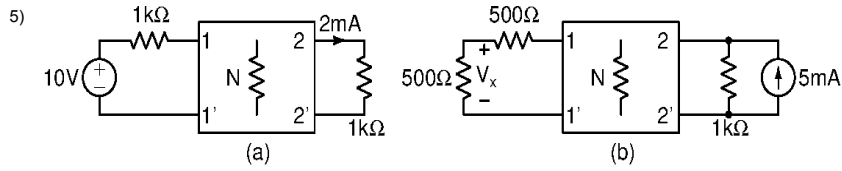
The answer is the value of the expression given below:

$$(g_{11} \times g_{22}) + (g_{12} \times g_{21})$$

(Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -14.6,-14.4

1 point

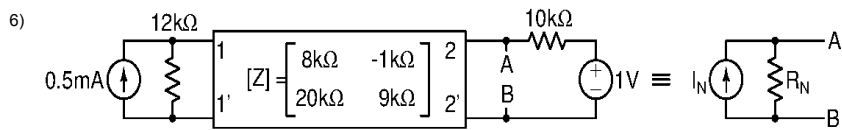


The network N in the figure above consists of only resistors. Given (a), determine V_x in (b).

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.4,0.6

1 point



Determine the Norton current I_N in the circuit above.

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.6,0.8

1 point

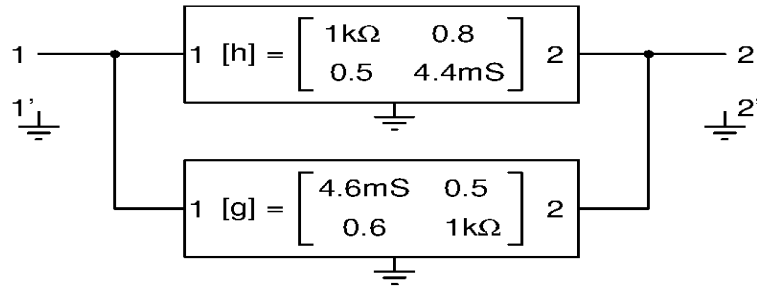
7) Determine the Norton resistance R_N in the circuit above.

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 4.8,5.2

1 point

8)



In the above circuit, two two-port networks are combined to form a single two-port network. Determine the y -parameters of the composite two-port.

$$[y] = \begin{bmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{bmatrix}$$

where,

y_{ij} 's are the numerical values in **millisiemens**(mS).

e.g If you get 1st row and 1st column of $[y]$ as $-1 mS$, then $y_{11} = -1$.

The answer is the value of the expression given below:

$$y_{11} + y_{12} + (y_{21} \times y_{22})$$

(Round off fractional answers to one decimal place.)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 4.4,4.6

1 point