

# task\_x357drkaqv84jnsc\_with\_calculation

## Student Group

First Name	Surname	Matrikel Nr.

## Table of Contents

Exercise E1 Pure Resistor Network Simplification (written test, approx. 13 % of a 60-minute written test, WS2022) .....	2
---	---

exam ee1 WS2022

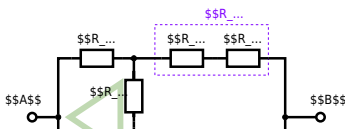
**Exercise E1 Pure Resistor Network Simplification**  
**(written test, approx. 13 % of a 60-minute written test, WS2022)**

The following shall now be closed. Calculate the equivalent resistance  $R_{eq}$  between  $A$  and  $B$ .

Solution

$$R_{eq} = 133.8 \Omega$$

Now a wye-delta transformation is necessary.



Since  $R_2 = R_3$  and based on the equations for the transformation, the transformed  $R_Y$  is given as:

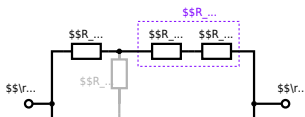
$$R_Y = \frac{R_2 \cdot R_2}{R_2 + R_2 + R_2} = \frac{(100 \Omega)^2}{3 \cdot 100 \Omega} = \frac{1}{3} \cdot 100 \Omega = 33.33 \Omega$$

The equivalent resistor is given by a parallel configuration of resistors in series:

$$R_{eq} = R_Y + (R_Y + R_1 + R_1) \parallel (R_Y + R_2) \parallel R_{eq} = 33.33 \Omega + (33.33 \Omega + 400 \Omega) \parallel (33.33 \Omega + 100 \Omega) \parallel$$

... The switch shall now be open. Calculate the equivalent resistance  $R_{eq}$  between  $A$  and  $B$ .

Solution



The equivalent resistor is given by a parallel configuration of resistors in series:

$$R_{eq} = (R_2 + R_1 + R_1) \parallel (R_2 + R_2) \parallel R_{eq} = (100 \, \Omega + 200 \, \Omega + 200 \, \Omega) \parallel (100 \, \Omega + 100 \, \Omega) \parallel R_{eq} = (500 \, \Omega) \parallel (200 \, \Omega) \parallel R_{eq} = \frac{\{500 \, \Omega \cdot 200 \, \Omega\}}{500 \, \Omega + 200 \, \Omega}$$

From:

<https://wiki.mexle.org/> - MEXLE Wiki

Permanent link:

[https://wiki.mexle.org/electrical\\_engineering\\_1/task\\_x357drkaqv84jnsc\\_with\\_calculation?rev=1680387933](https://wiki.mexle.org/electrical_engineering_1/task_x357drkaqv84jnsc_with_calculation?rev=1680387933)

Last update: 2023/04/02 00:25

