

# task\_x357drkaqv84jnc\_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
---	---

network simplification, exam ee1 WS2022

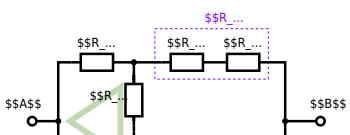
**Exercise E1 Pure Resistor Network Simplification  
(written test, approx. 13 % of a 60-minute written test, WS2022)**

The following shall be solved at a rate of  $R_2 = R_3 = 100 \Omega$  and the result shall be given in  $\Omega$ .

Solution  

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

Now a wye-delta transformation is necessary.

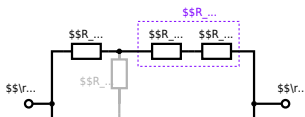


Since  $R_2 = R_3$  and based on the equations for the transformation, the transformed  $R_Y$  is given as: 
$$R_Y = \frac{R_2 \cdot R_2}{R_2 + R_2 + R_2} = \frac{(100 \Omega)^2}{3 \cdot 100 \Omega} = \frac{1}{3} \cdot 100 \Omega = 33.33 \Omega$$

The equivalent resistor is given by a parallel configuration of resistors in series: 
$$R_{\text{eq}} = R_Y + (R_Y + R_1 + R_1) \parallel (R_Y + R_2) \parallel R_3$$
  

$$= 33.33 \Omega + (33.33 \Omega + 400 \Omega) \parallel (33.33 \Omega + 100 \Omega) \parallel 100 \Omega$$
  
 .. The switch shall now be open. Calculate the equivalent resistance  $R_{\text{eq}}$  between A and B.

Solution



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

$$R_{\text{eq}} = (R_2 + R_1 + R_1) \parallel (R_2 + R_2) \parallel R_{\text{eq}} = (100 \sim \Omega + 200 \sim \Omega + 200 \sim \Omega) \parallel (100 \sim \Omega + 100 \sim \Omega) \parallel R_{\text{eq}} = \{500 \sim \Omega \cdot 200 \sim \Omega\} \over {500 \sim \Omega + 200 \sim \Omega}$$

From:  
<https://mexle.te.hs-heilbronn.de/> - MEXLE Wiki

Permanent link:  
[https://mexle.te.hs-heilbronn.de/electrical\\_engineering\\_1/task\\_x357drkaqv84jnsj\\_with\\_calculation?rev=1690219963](https://mexle.te.hs-heilbronn.de/electrical_engineering_1/task_x357drkaqv84jnsj_with_calculation?rev=1690219963)

Last update: **2023/07/24 19:32**

