

# task\_I9hubowt6x00b2h5\_with\_calculation

## Student Group

First Name	Surname	Matrikel Nr.

## Table of Contents

Exercise E1 Determining the Current from Charge per Time .....	2
--	---

## current, charge, chapter1 4

### Exercise E1 Determining the Current from Charge per Time

Two objects experience a charge increase over time, as shown in [figure 1](#). One object has a non-linear increase in the charge per time.

#### Result

A non-linear charge increase leads to a non-constant current.

For a non-constant current, one has to use the time derivative of the charge  $Q$  to get the current  $I$ .

So, the formula  $I = \frac{dQ}{dt}$  has to be used instead of  $I = \frac{\Delta Q}{\Delta t}$ .

Fig. 1: Time course of the charge ...

1. Determine the currents  $I_1$  and  $I_2$  for the two objects from the  $Q$ - $t$ -diagram [figure ##](#) and plot the currents into a new diagram.

#### Solution

- Have a look how much increase  $\Delta Q$  per time duration  $\Delta t$  is there for each object.
- For this choose a distinct time period, e.g. between  $0 \text{ s}$  and  $20 \text{ s}$ .
- The current is then given as the change in charge per time:  $I = \frac{\Delta Q}{\Delta t}$

From:

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

Permanent link:

[https://wiki.mexle.te.hs-heilbronn.de/electrical\\_engineering\\_1/task\\_l9hubowt6x00b2h5\\_with\\_calculation?rev=1680522661](https://wiki.mexle.te.hs-heilbronn.de/electrical_engineering_1/task_l9hubowt6x00b2h5_with_calculation?rev=1680522661)

Last update: **2023/04/03 13:51**

