

Assignment 2 to 3.2.3.3 - Solution -

For a machine the following data are given:

$CI_0 := 140000$ Initial investment

$n := 7$ Useful life in years

$R_n := 40000$ Residual value at the end of useful life

For the capital invested after t years the following function is valid:

$$CI(t) := CI_0 - \frac{CI_0 - R_n}{n} \cdot t \quad \text{Capital invested}$$

The average capital invested is:

$$CI_a := \frac{\int_0^n CI(t) dt}{n} \quad \text{Average capital invested}$$

Determine CI_a in figures and in symbols.

$$CI(t) := 140000 - \frac{100000}{7} \cdot t$$

$$\int_0^n CI(t) dt = 630000$$

$$\frac{\int_0^n CI(t) dt}{n} = 90000$$

$$CI_a = 90000$$

Symbolic solution:

$$CI_0 := CI_0$$

$$n := n$$

$$R_n := R_n$$

$$CI(t) := CI_0 - \frac{CI_0 - R_n}{n} \cdot t$$

$$\frac{\int_0^n CI(t) dt}{n} \rightarrow \frac{\left(\frac{1}{2} \cdot CI_0 \cdot n + \frac{1}{2} \cdot n \cdot R_n \right)}{n}$$

$$CI_a := \frac{CI_0 + R_n}{2}$$