$$U = \frac{R_1 \cdot R_2}{R_1 + R_2} \cdot I$$

$$R_1 = 5\,\Omega \;,\; R_2 = 10\,\Omega \;,\; U = 20V$$

$$\frac{dR_1}{dt} = 0,02\,\frac{\Omega}{s} \;,\; \frac{dR_2}{dt} = 0,01\,\frac{\Omega}{s} \;,\; \frac{dU}{dt} = -0,05\,\frac{V}{s}$$

$$\frac{dI}{dt} = ?$$

Oplossing

$$I(R_1, R_2, U) = \frac{R_1 + R_2}{R_1 \cdot R_2} \cdot U$$

$$\frac{dI}{dt} = \frac{\partial I}{\partial R_1} \cdot \frac{dR_1}{dt} + \frac{\partial I}{\partial R_2} \cdot \frac{dR_2}{dt} + \frac{\partial I}{\partial U} \cdot \frac{dU}{dt}$$

$\Downarrow$ met rekentoestel

$$\frac{\partial I}{\partial R_1} \;,\; \frac{\partial I}{\partial R_2} \;\text{en}\; \frac{\partial I}{\partial U} \;\text{berekenen}$$

in $(R_1 = 5, R_2 = 10, U = 20)$

$$i(r1,r2,u) := \frac{r1+r2}{r1 \cdot r2} \cdot u$$

Done

$$iafleidenr1(r1,r2,u) := \frac{d}{dr1}\left(i(r1,r2,u)\right)$$

Done

$$iafleidenr1(5,10,20)$$

$$\frac{-4}{5}$$

$$iafleidenr2(r1,r2,u) := \frac{d}{dr2}\left(i(r1,r2,u)\right)$$

Done

$$iafleidenr2(5,10,20)$$

$$\frac{-1}{5}$$

$$iafleidenu(r1,r2,u) := \frac{d}{du}\left(i(r1,r2,u)\right)$$

Done

$$iafleidenu(5,10,20)$$

$$\frac{3}{10}$$

invullen:

$$\left.\frac{dI}{dt}\right|_{t=20} = -\frac{4}{5} \cdot 0{,}02 + \frac{-1}{5} \cdot 0{,}01 + \frac{3}{10} \cdot (-0{,}05)$$

$$= -0{,}033 \ \frac{A}{s}$$