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appVersion(4) = "0.99.6884.37264"
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$$R_1 := 100 \quad C_1 := 1.5 \cdot 10^{-6}$$

$$I_0 := 1 \cdot 10^{-5}$$

$$i(u) := I_0 \cdot \left(\exp\left(\frac{u}{0.05}\right) - 1 \right)$$

$$f := 20 \cdot 10^3 \quad F := 1 \cdot 10^3 \quad U_m := 5 \quad m_a := 0.5 \quad \omega := 2 \cdot \pi \cdot f \quad \Omega := 2 \cdot \pi \cdot F$$

$$u_{in}(t) := U_m \cdot (1 - m_a \cdot \cos(\Omega \cdot t)) \cdot \sin(\omega \cdot t)$$

$$AbsTol := 10^{-4} \quad RelTol := 10^{-4}$$

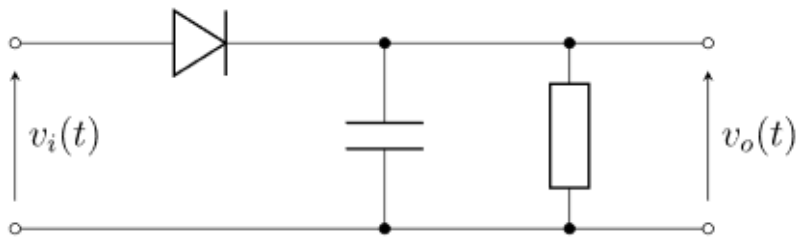
$$u_0 := 0 \quad t_{min} := 0 \quad t_{max} := 0.002 \quad N := 10^3$$

$$D(t, u) := -\frac{u}{R_1 \cdot C_1} + \frac{1}{C_1} \cdot (i(u_{in}(t)) - u)$$

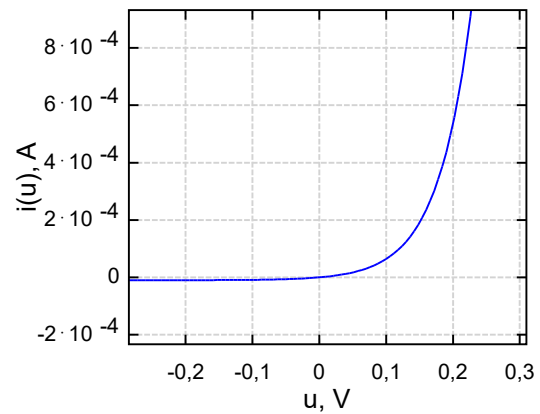
$$start := \text{time}(0)$$

$$u_{out} := \text{rk9st}(u_0, t_{min}, t_{max}, N-1, D)$$

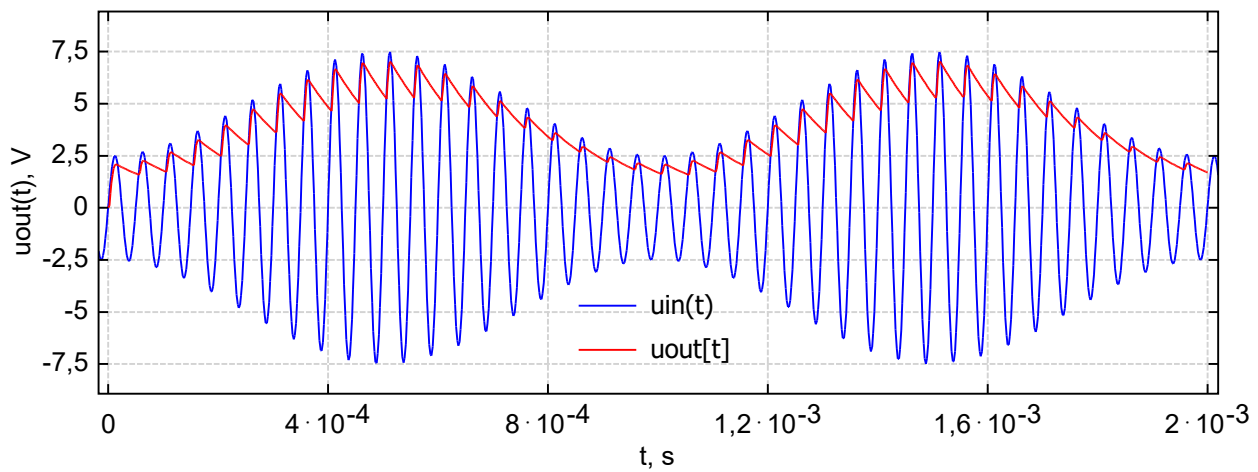
$$\text{time}(0) - start = 1.87 \text{ c}$$



I-V curve



Amplitude detector



$$\begin{cases} u_{in}(t) \\ u_{out} \end{cases}$$