

2.1

$$\lambda_S = \frac{CO + CO_2}{CO + CO_2 + C_3H_8} \cdot \left( \frac{11.492 \cdot C_B \left(1 + \frac{CO}{2CO_2} + \frac{O_2}{CO_2}\right)}{1 + \frac{CO}{CO_2}} + \frac{120 \cdot H_B}{3.5 + \frac{CO}{CO_2}} - 4.313 \cdot O_B \right) \cdot \frac{1}{L_{St}}$$

3.1

$$t_H = \frac{p \cdot d^2}{a \cdot U^2}$$

$$\begin{aligned} Q &= 125 \text{ pF} \cdot 31 \text{ kV} \\ &= 3.9 \text{ } \mu\text{C} \end{aligned}$$

3.2

$$\begin{aligned} L &= \left( (2 \cdot \pi \cdot f)^2 \cdot C \right)^{-1} \\ &\approx 80 \text{ nH} \end{aligned}$$

3.3

$$L = 2 \cdot l \cdot \ln(D/d)$$

4.1

$$E_Z = \frac{C_S \cdot U_{DB}^2}{2}$$

4.2

$$R \sim d \cdot \sqrt{p}$$

4.3

$$R \sim d \cdot p^m$$

5.1

$$\begin{aligned} E_G &= (1 - \epsilon_H) \cdot U_C \cdot \int dt I \\ &= (1 - \epsilon_H) \cdot U_C \cdot \frac{I_0 \cdot T}{2} \\ \Rightarrow U_C &= \frac{2 \cdot E_G}{I_0 \cdot T \cdot (1 - \epsilon_H)} \\ U_C &\approx 310 \text{ V} \end{aligned}$$

5.2

$$\delta = \frac{1}{\sqrt{\pi \cdot f \cdot \mu_0 \cdot \mu_r \cdot \sigma_i}}$$

5.3

$$\frac{R}{l} = \frac{1}{\pi \cdot d \cdot \delta \cdot \sigma_a}$$

5.4

$$\begin{aligned} R_s &= \tan \delta \cdot X_C \\ \text{mit: } X_C &= (2 \cdot \pi \cdot f \cdot C)^{-1} \end{aligned}$$

5.5

$$-I_\infty = \frac{U_{ges}}{R_{ges}}$$

5.6

$$\tau = \frac{2 \cdot L}{R_{ges}}$$

5.7

$$i = I_0 - (I_0 + I_\infty) \cdot (1 - e^{-\frac{t}{\tau}})$$

5.8

$$T = \tau \cdot \ln \left( \frac{I_0}{I_\infty} + 1 \right)$$

5.9

$$E_u = u \cdot \int_0^T dt i$$

5.10

$$E_r = r \cdot \int_0^T dt i^2$$

5.11

$$\int_0^T dt i = \frac{-2 \cdot L \cdot U_{ges}}{R_{ges}^2} \cdot \ln \left( \frac{I_0 \cdot R_{ges}}{U_{ges}} + 1 \right) + \frac{2 \cdot L \cdot I_0}{R_{ges}}$$

5.12

$$\int_0^T dt i^2 = \frac{-2 \cdot L \cdot U_{ges}^2}{R_{ges}^3} \cdot \ln \left( \frac{I_0 \cdot R_{ges}}{U_{ges}} + 1 \right) + \frac{2 \cdot L \cdot I_0}{R_{ges}} \cdot \left( \frac{I_0}{2} - \frac{U_{ges}}{R_{ges}} \right)$$

5.13

$$R = \Phi \cdot d \cdot p_{abs}^{0,4}$$

5.14

$$E_G = (1 - \epsilon_H) \cdot R_Z \cdot \int_0^T dt i^2$$

5.15

$$f = \left( 2 \cdot \pi \sqrt{L \cdot C} \right)^{-1}$$

5.16

$$f \sim \frac{1}{\sqrt{C}}$$

5.17

$$R_s \sim \frac{1}{f \cdot C}$$

6.1

$$\tau = \frac{1}{\beta \cdot n}$$