



ZÁPADOČESKÁ  
UNIVERZITA  
V PLZNI

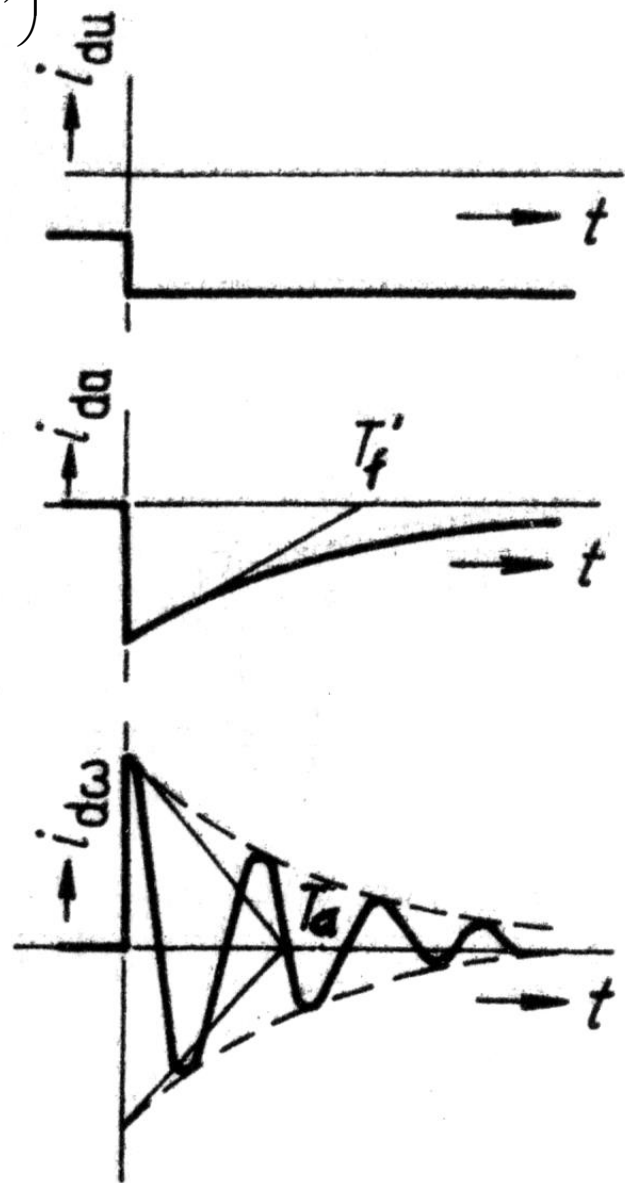
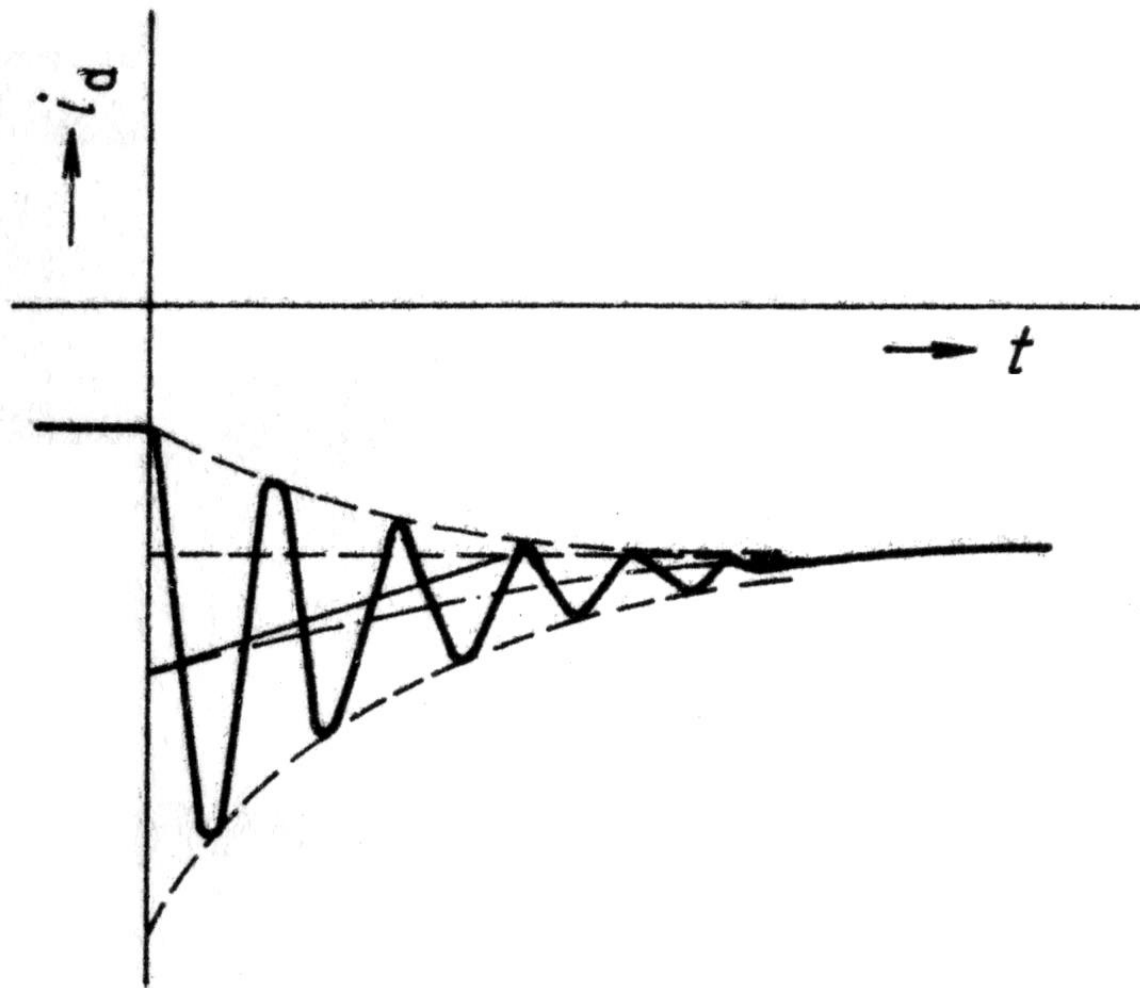


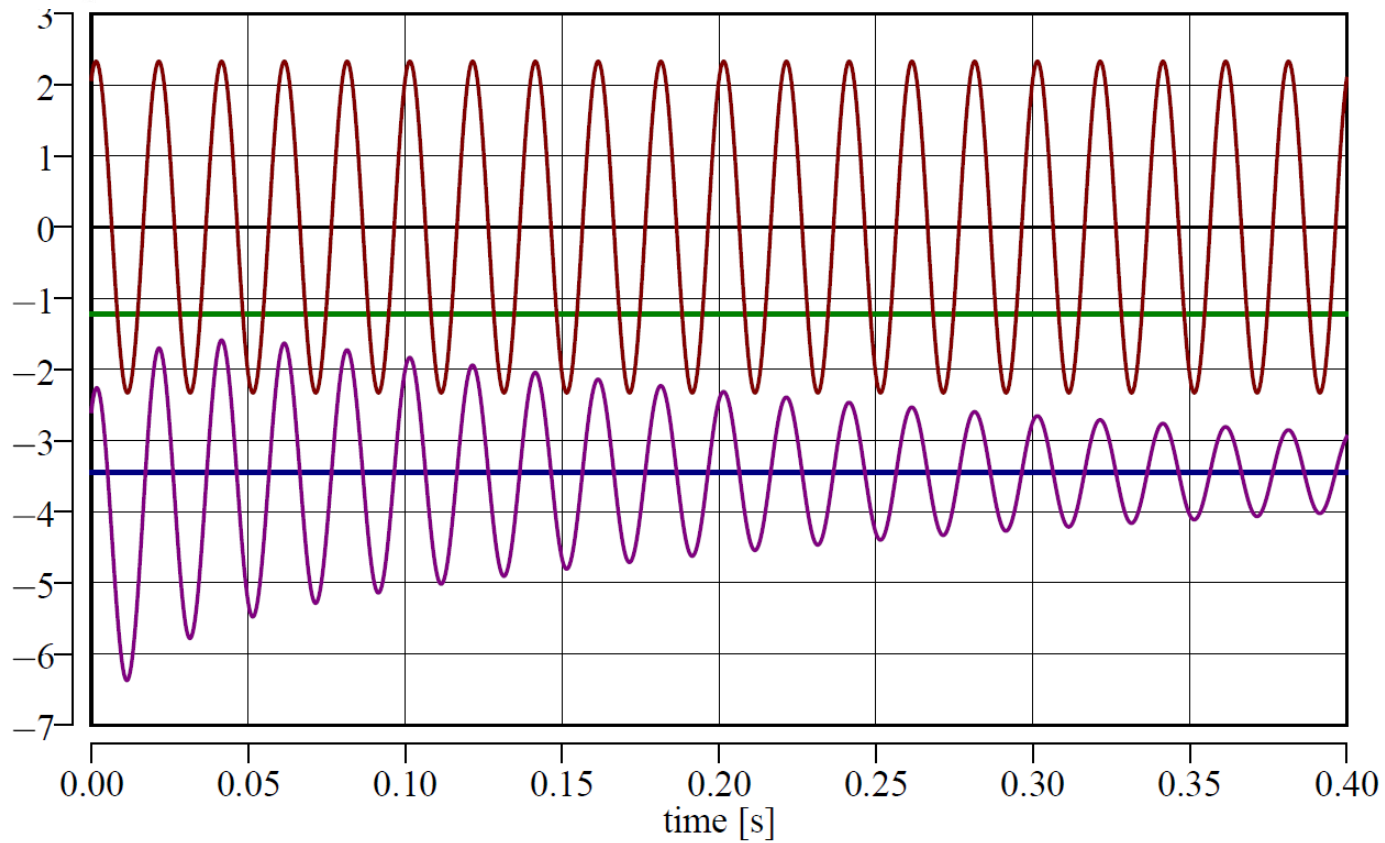
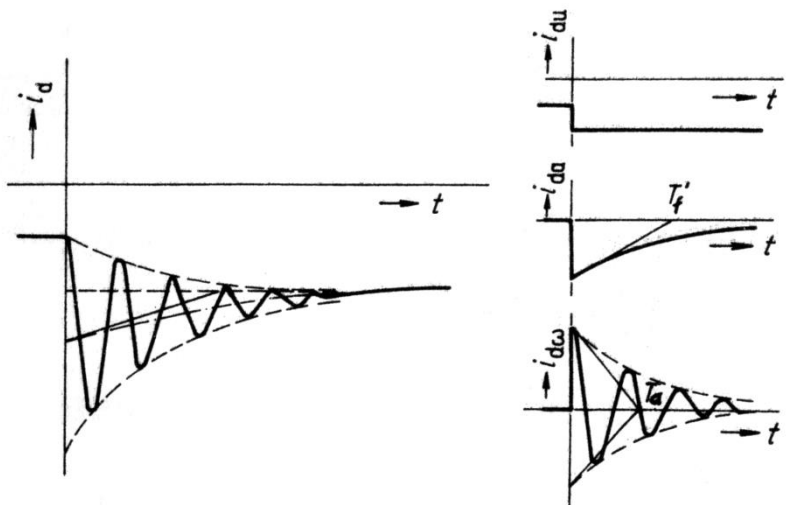
# Zkrat na svorkách alternátoru

doc. Ing. Karel Noháč, Ph.D.  
Plzeň 2016

$$i_d(t) = i_{d[u]} + i_{dhu} + i_{da}(t) + i_{d\omega}(t) = i_{d[u]} + i_{dhu} + i_{da} e^{-\frac{t}{T_f'}} + i_{d\omega} e^{-\frac{t}{T_a}} =$$

$$i_d(t) = -\frac{e_{[0]}}{x_d} - u_{q[0]} \left( \frac{x_d' - x_d}{x_d' \cdot x_d} \right) e^{-\frac{t}{T_f'}} + \left( \frac{u_{q[0]}}{x_d'} \cos(\omega \cdot t) + \frac{u_{d[0]}}{x_d'} \sin(\omega \cdot t) \right) e^{-\frac{t}{T_a}}$$

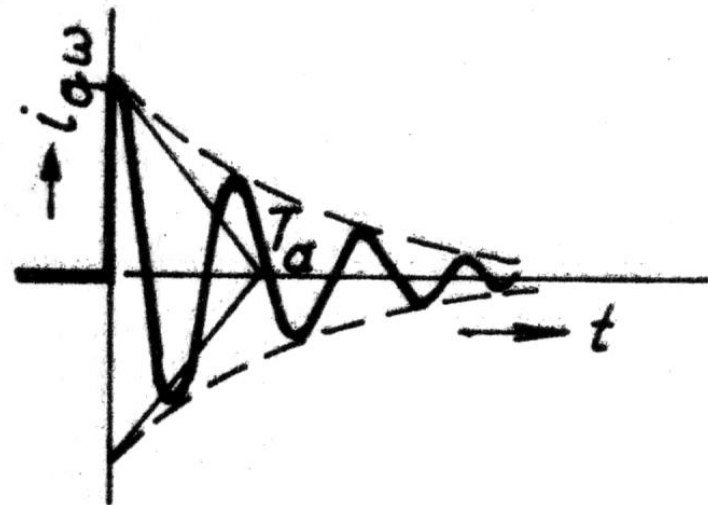
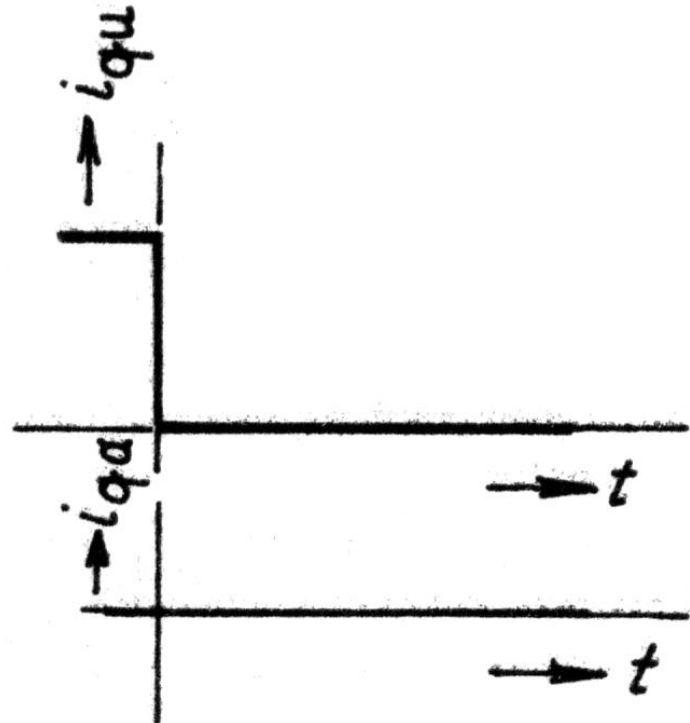
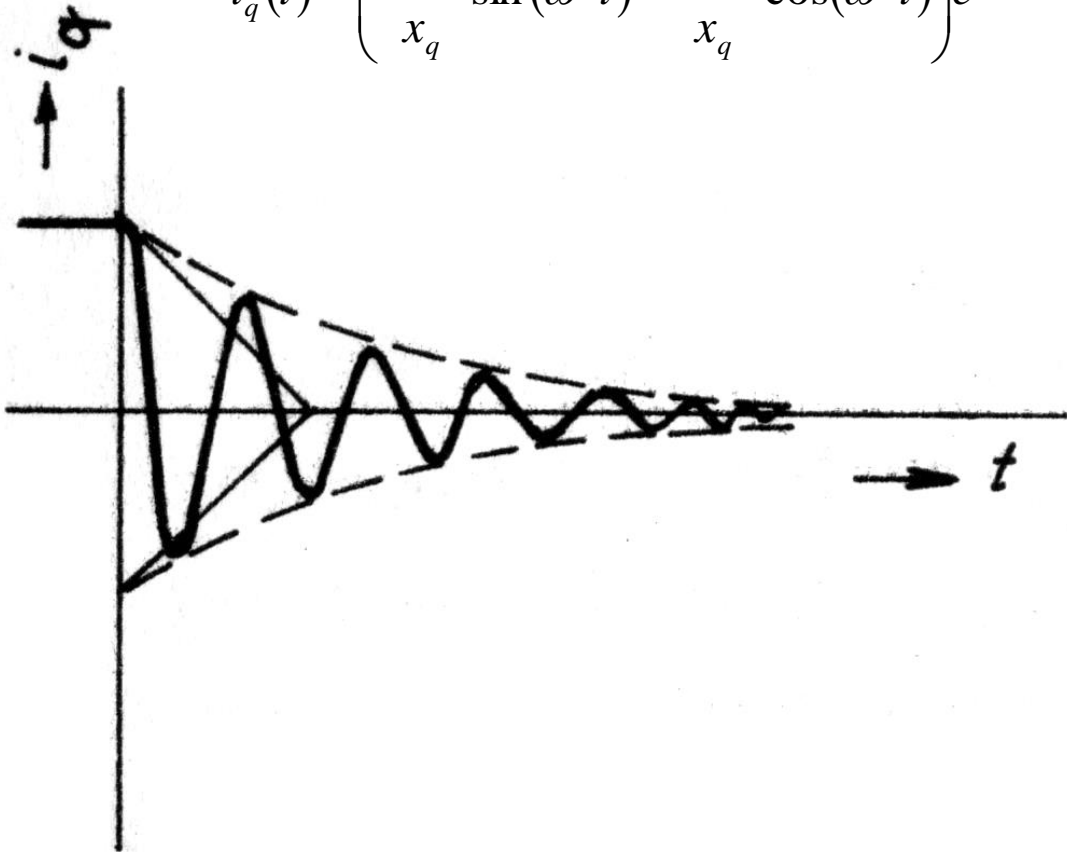


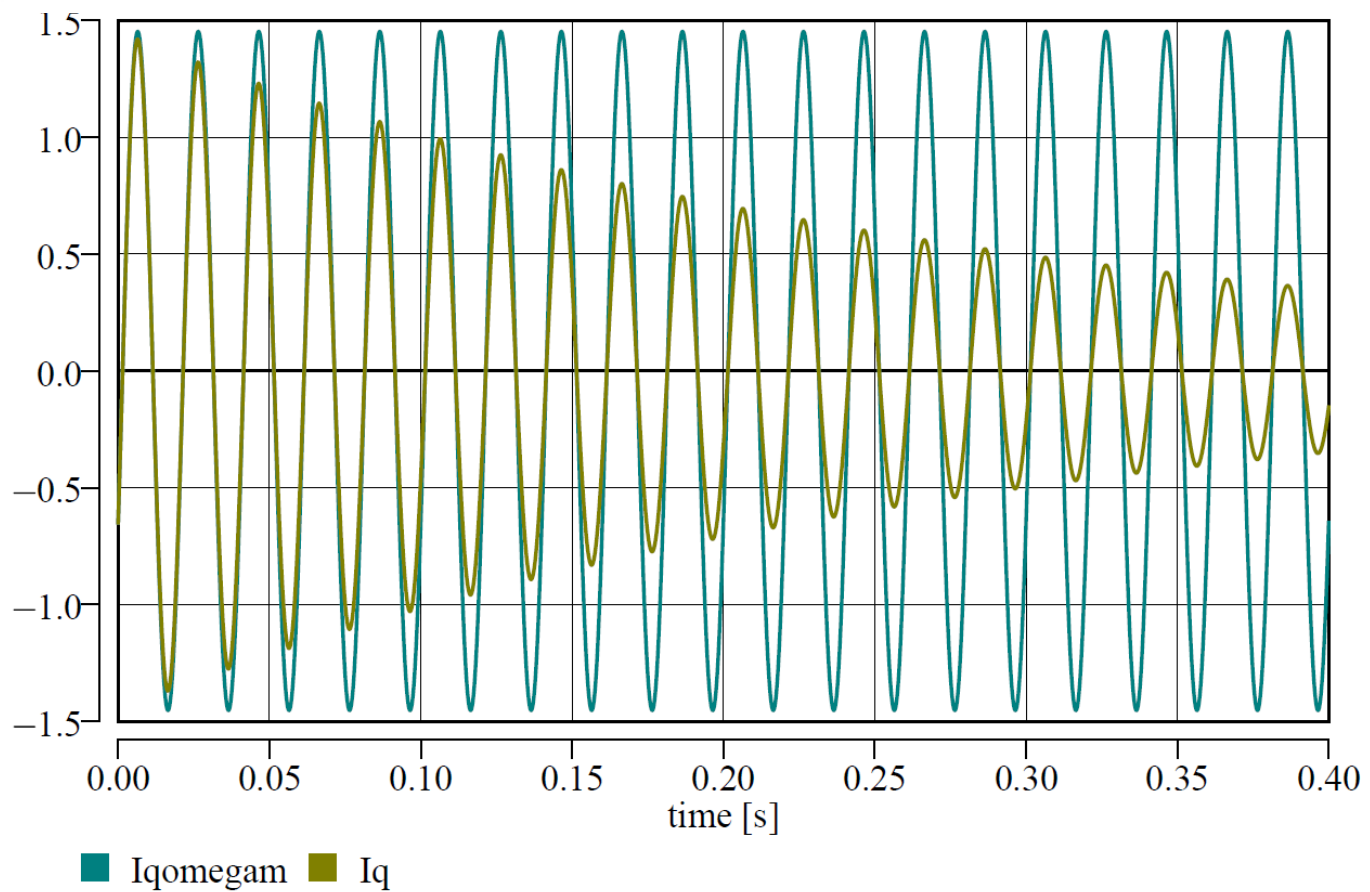
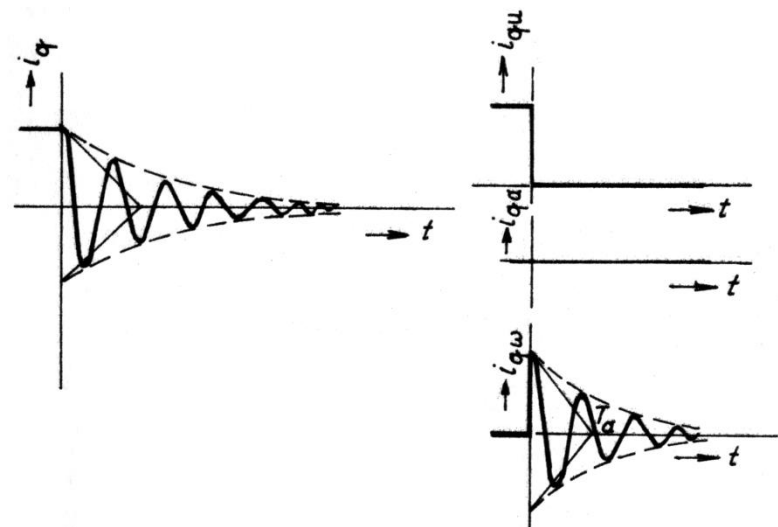


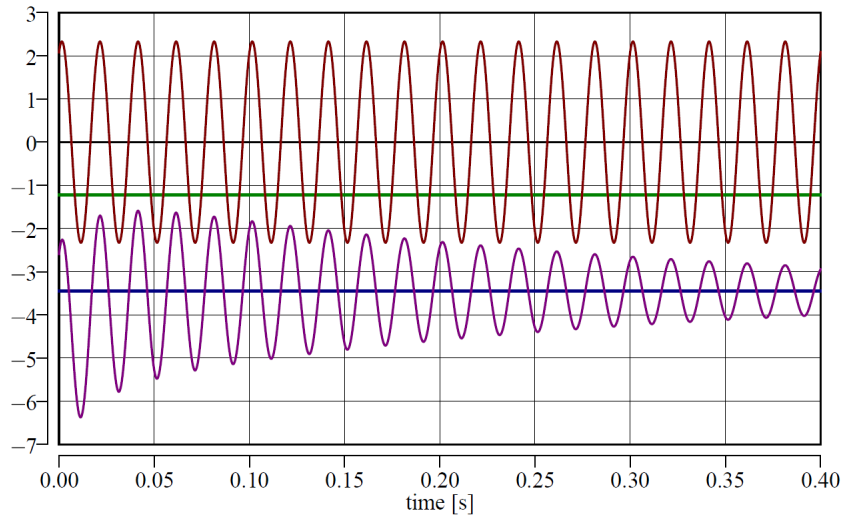
■ Idu     
 ■ Ida     
 ■ Idomegam     
 ■ Id

$$i_q(t) = i_{q[u]} + i_{qhu} + i_{q\omega}(t) = i_{q[u]} + i_{qhu} + i_{q\omega} e^{-\frac{t}{T_a}} =$$

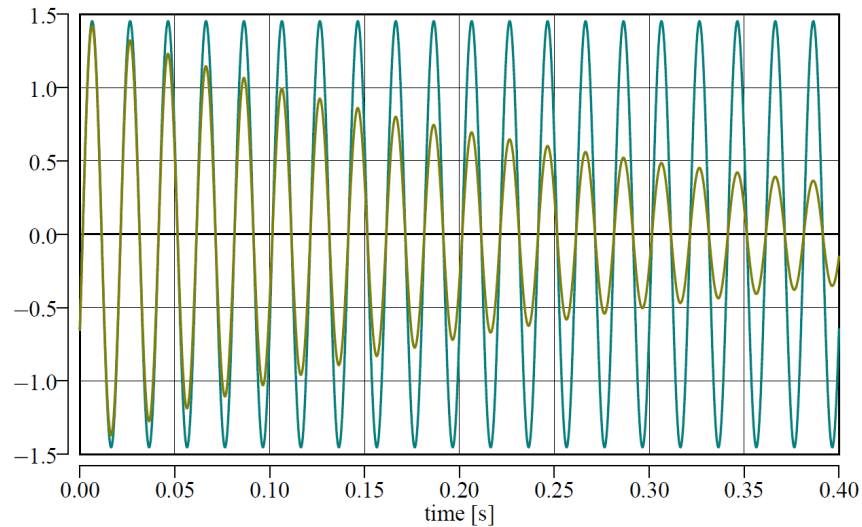
$$i_q(t) = \left( \frac{u_{q[0]}}{x_q} \sin(\omega \cdot t) - \frac{u_{d[0]}}{x_q} \cos(\omega \cdot t) \right) e^{-\frac{t}{T_a}}$$





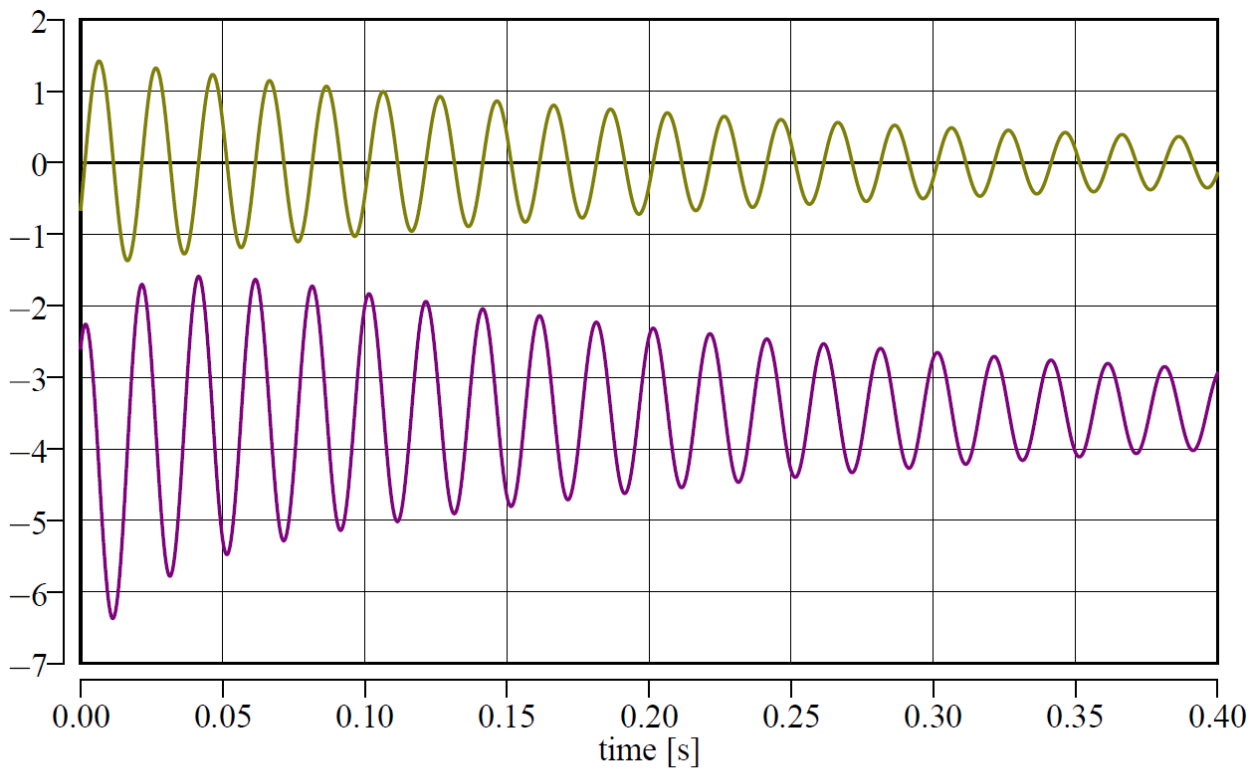


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■ Idu ■ Ida ■ Idomegam ■ Id

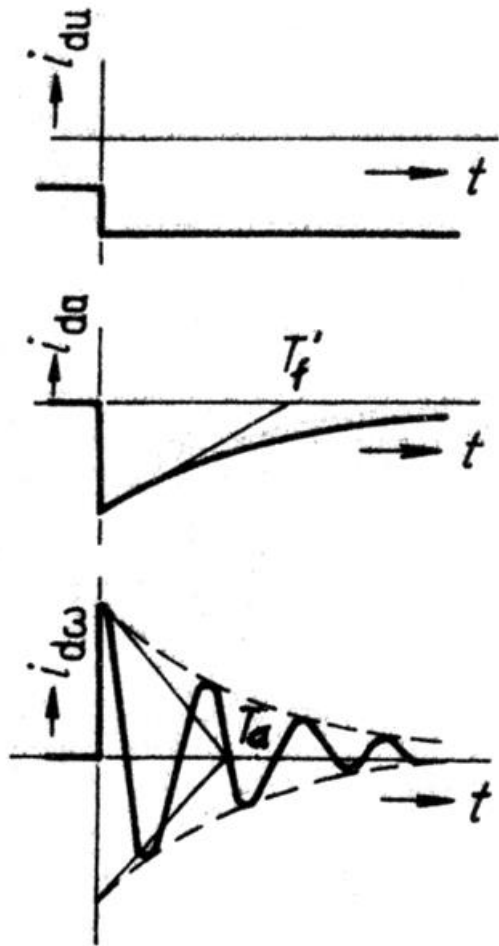
■ Iqomegam ■ Iq



■ Id ■ Iq

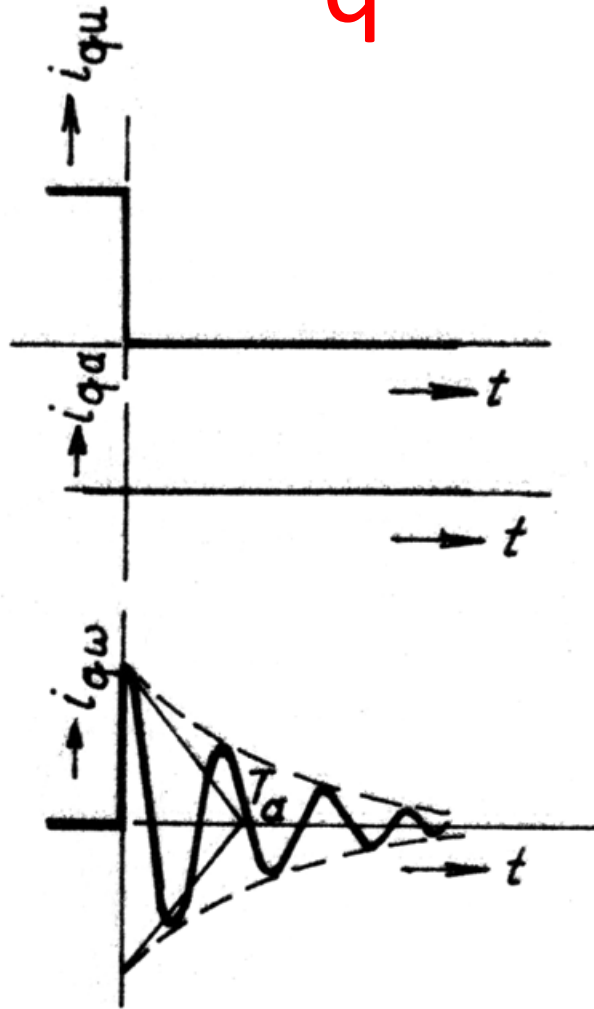
$$i_A(t) = i_d(t)\cos(\vartheta) + i_q(t)\sin(\vartheta) = \left( i_{d[u]} + i_{dhu} + i_{da}e^{-\frac{t}{T_f'}} + i_{dom}e^{-\frac{t}{T_a}} \right) \cos(\vartheta) + \left( i_{qom}e^{-\frac{t}{T_a}} \right) \sin(\vartheta)$$

d



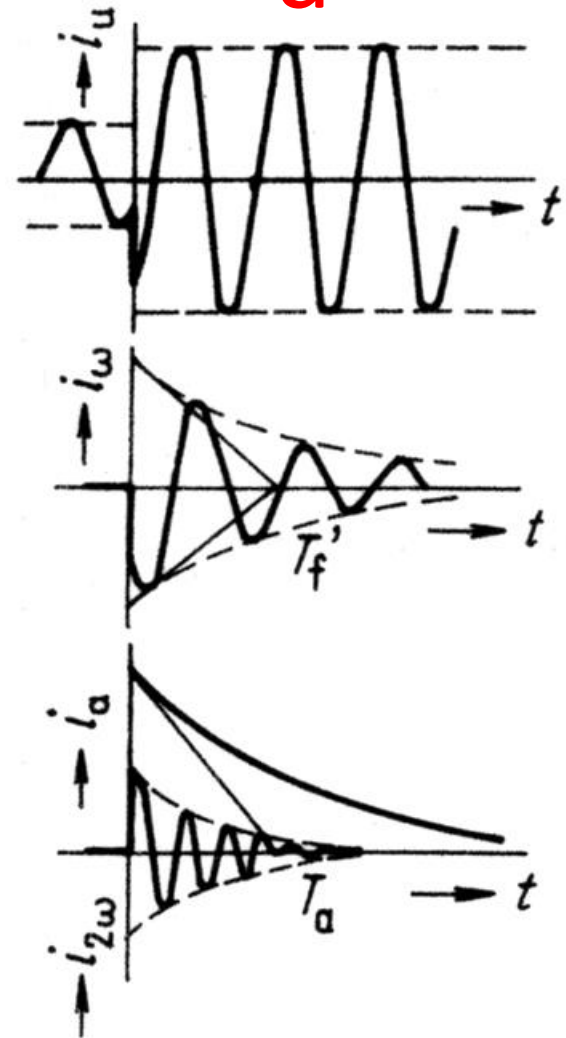
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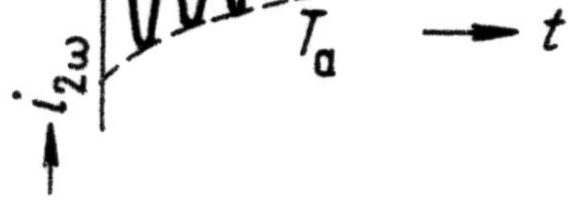
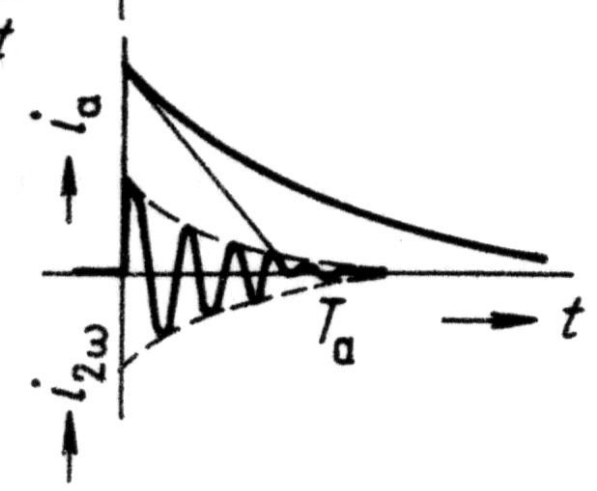
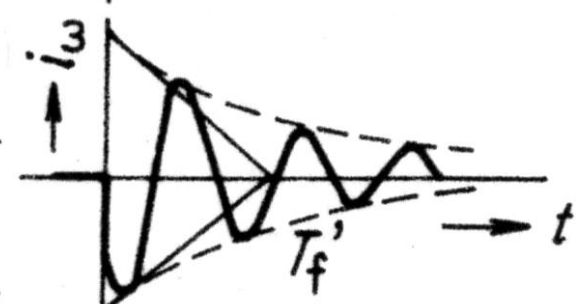
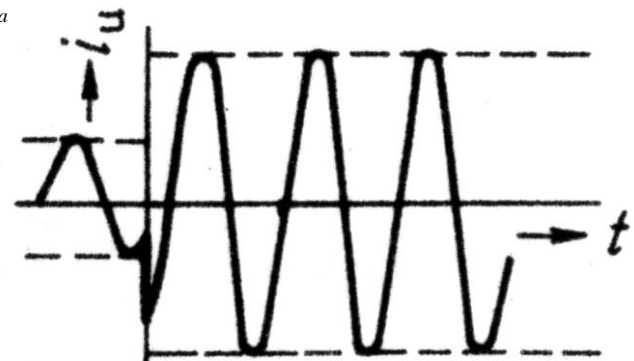
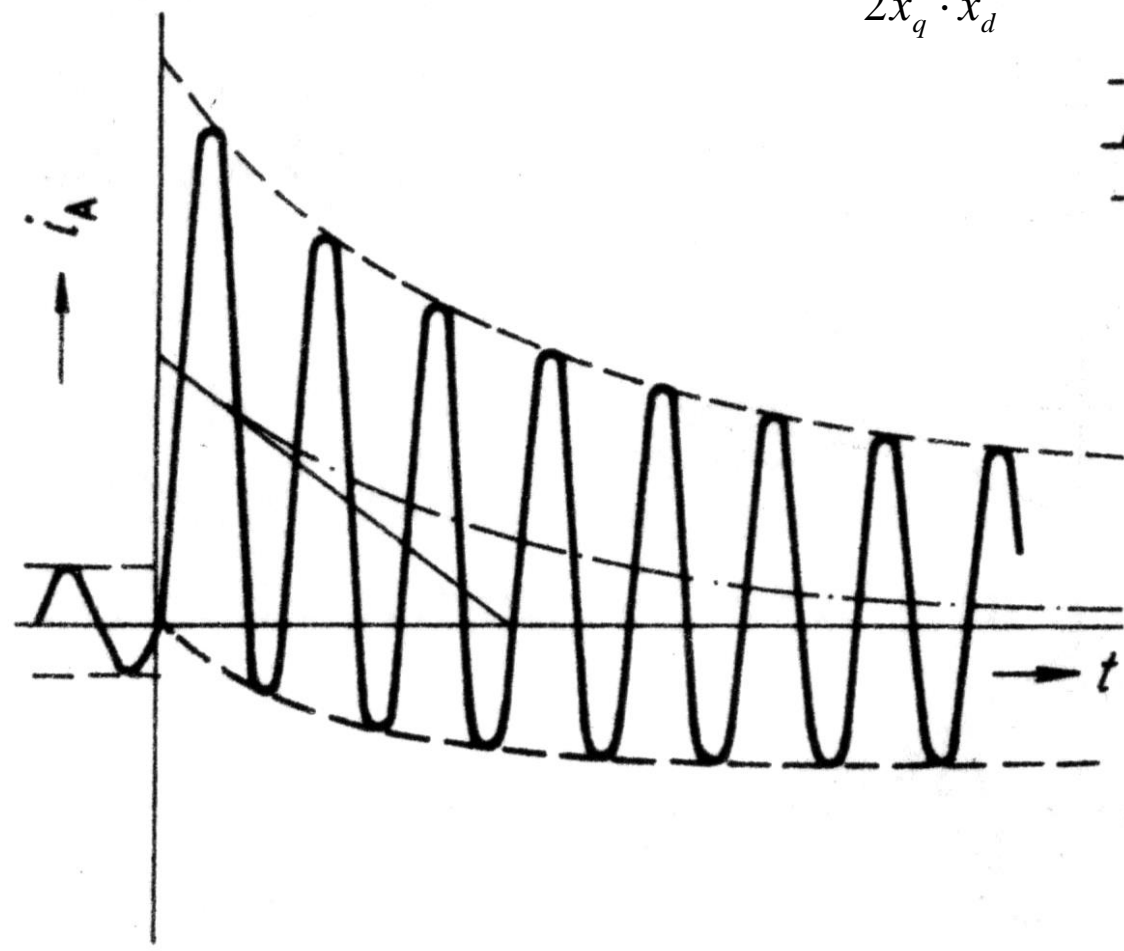
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a

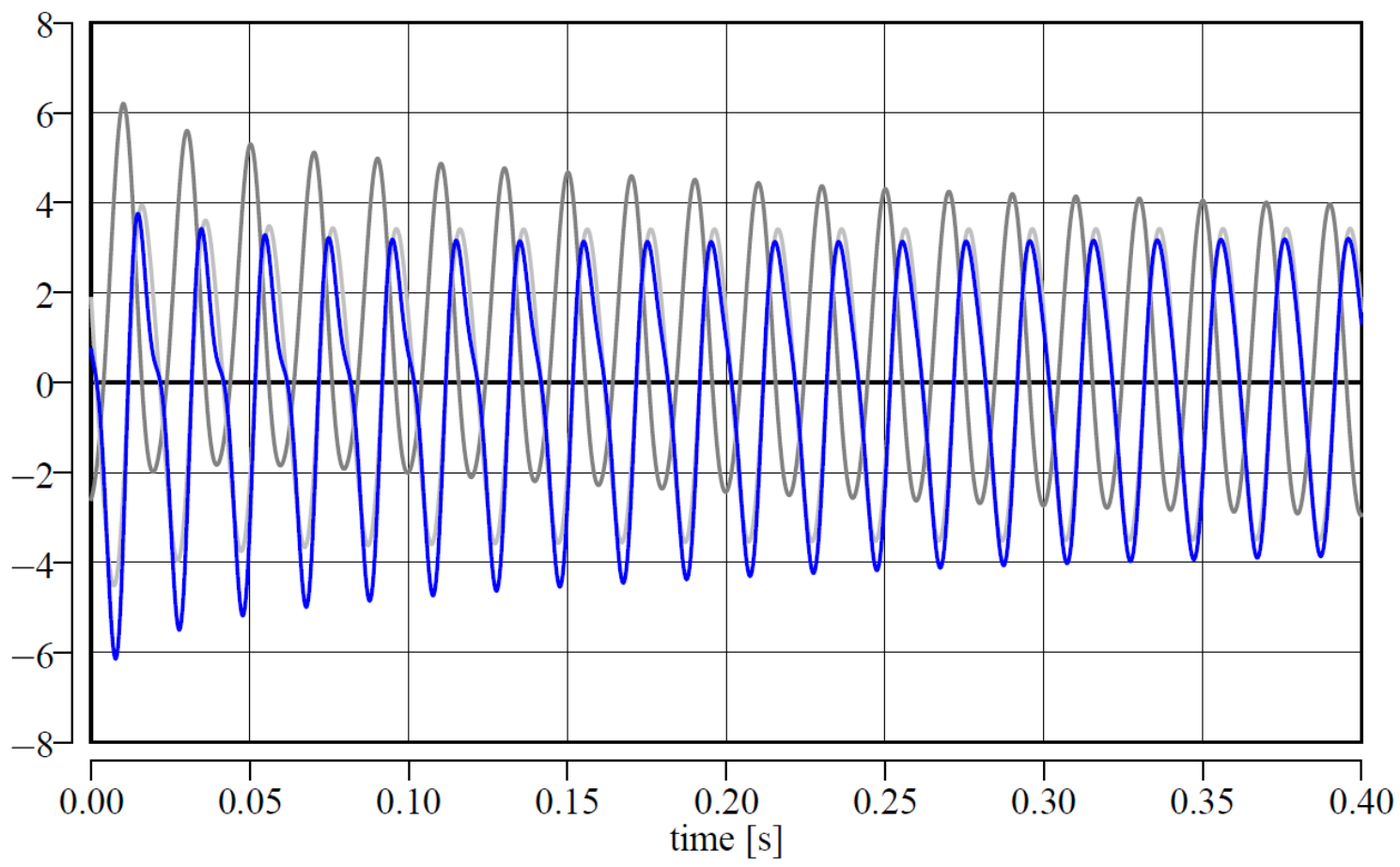
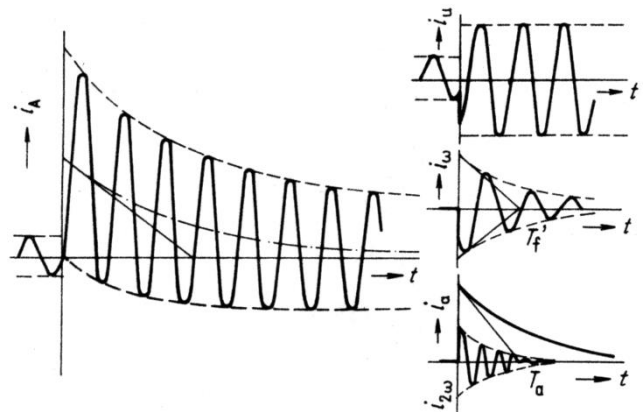


$$i_A(t) = - \left[ \frac{e_{[0]}}{x_d} + \left( \frac{e_{q[0]}'}{x_d'} - \frac{e_{[0]}}{x_d} \right) e^{-\frac{t}{T_f'}} \right] \cos(\omega \cdot t + \vartheta_0) + (u_{q[0]} \cos \vartheta_0 - u_{d[0]} \sin \vartheta_0) \frac{x_q + x_d'}{2x_q \cdot x_d'} e^{-\frac{t}{T_a}} +$$

$$+ [u_{q[0]} \cos(2\omega \cdot t + \vartheta_0) + u_{d[0]} \sin(2\omega \cdot t + \vartheta_0)] \frac{x_q - x_d'}{2x_q \cdot x_d'} e^{-\frac{t}{T_a}}$$

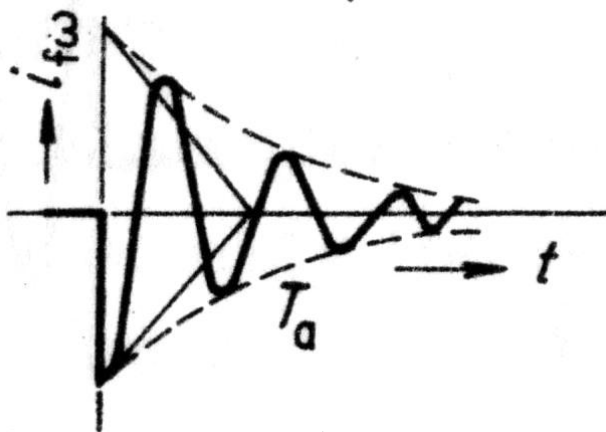
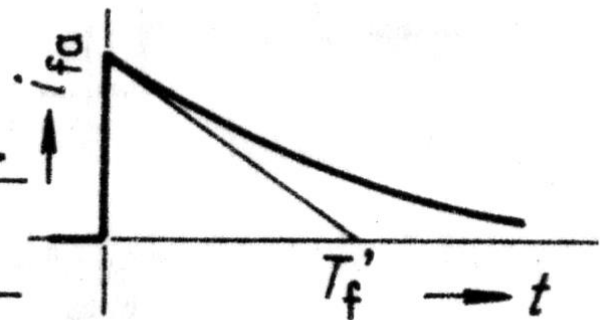
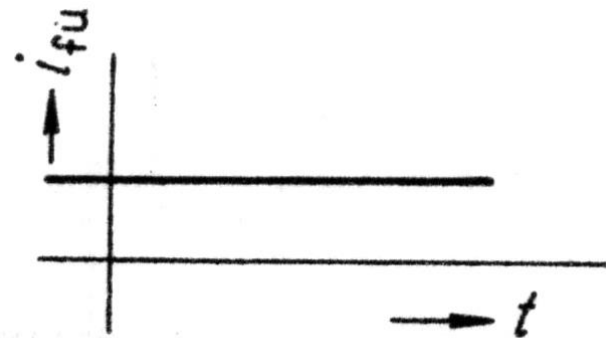
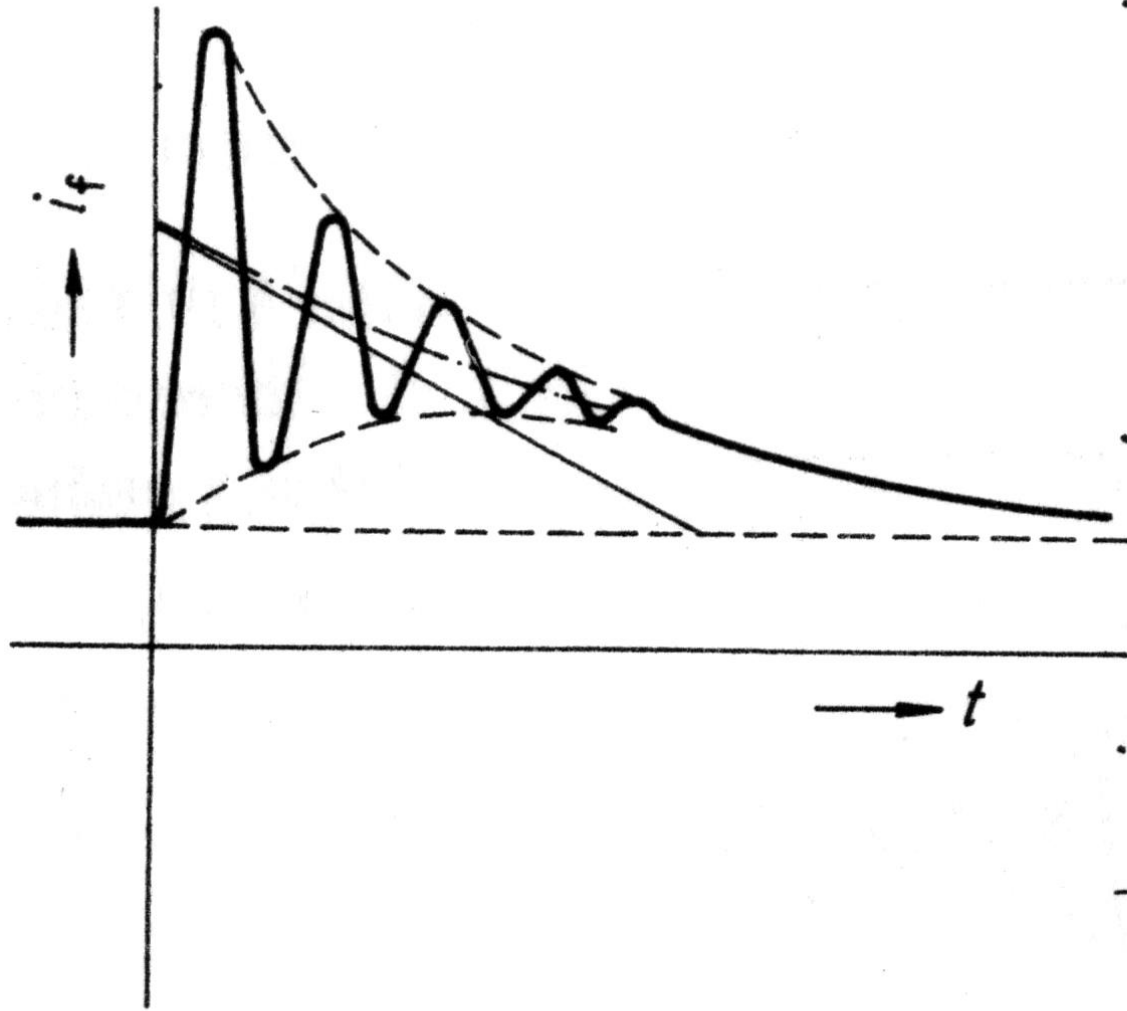




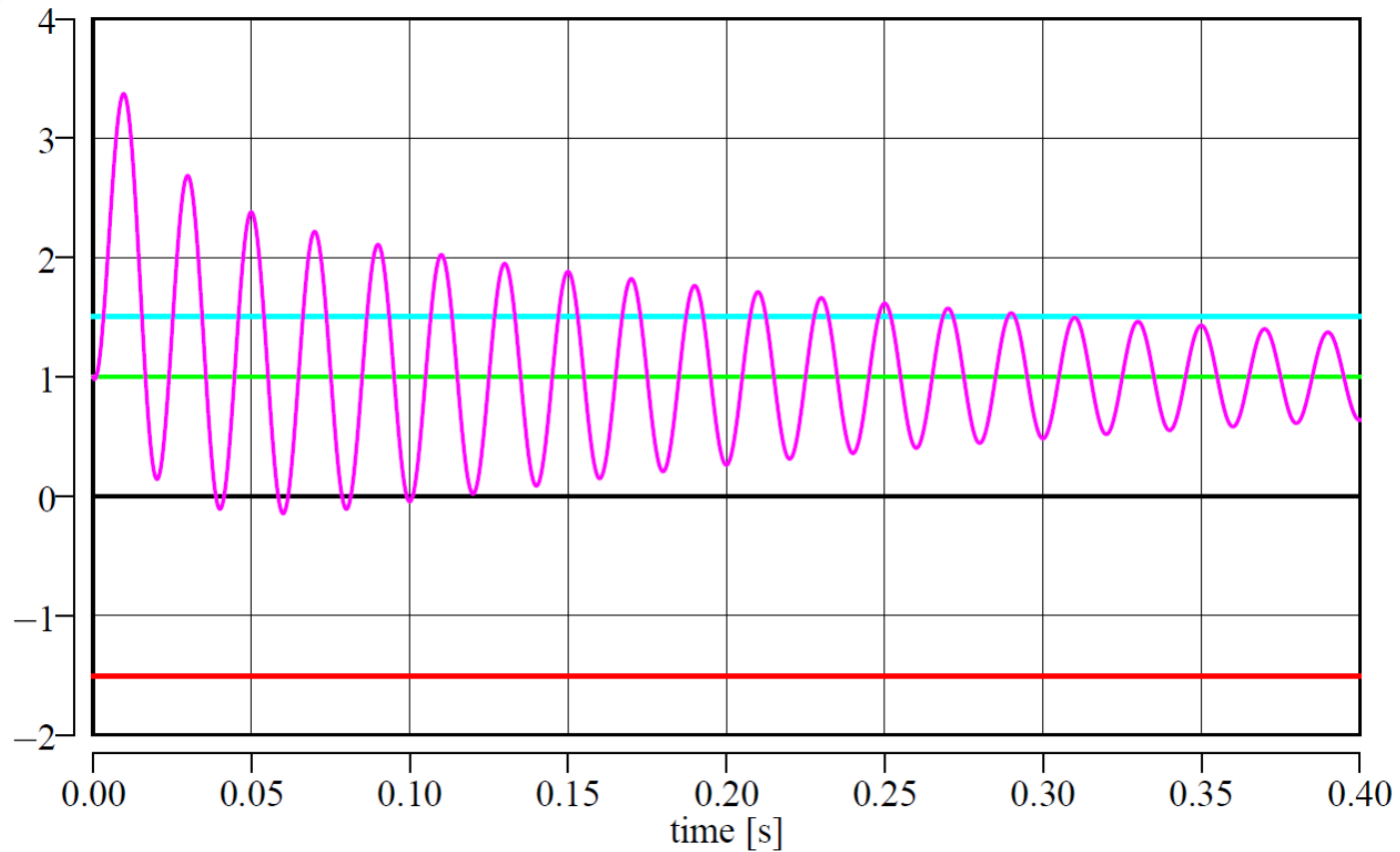
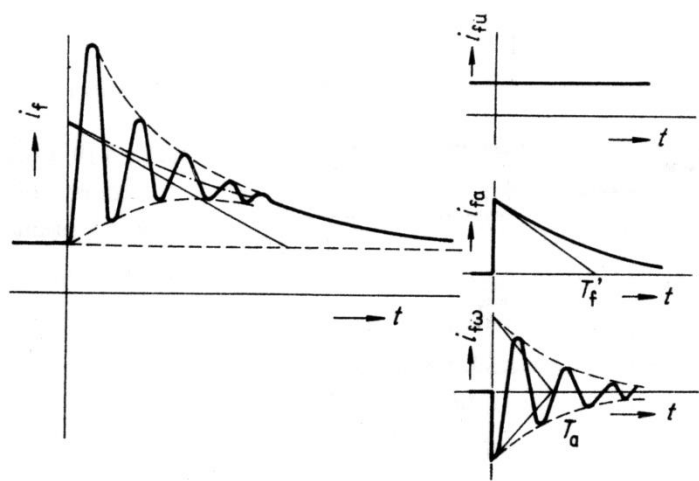


■  $I_a$  ■  $I_b$  ■  $I_c$

$$i_f(t) = i_{f[u]} + i_{fa}(0)e^{-\frac{t}{T_f'}} + i_{f\omega}(0)\cos(\omega \cdot t)e^{-\frac{t}{T_a}}$$



$$i_f(t) = i_{f[u]} + i_{fa} \left( e^{-\frac{t}{T_f'}} - \cos(\omega \cdot t) e^{-\frac{t}{T_a}} \right) = i_{f[u]} + \frac{x_d - x_d'}{x_{ad}} \cdot \frac{u_{q[0]}}{x_d'} \left( e^{-\frac{t}{T_f'}} - \cos(\omega \cdot t) e^{-\frac{t}{T_a}} \right)$$



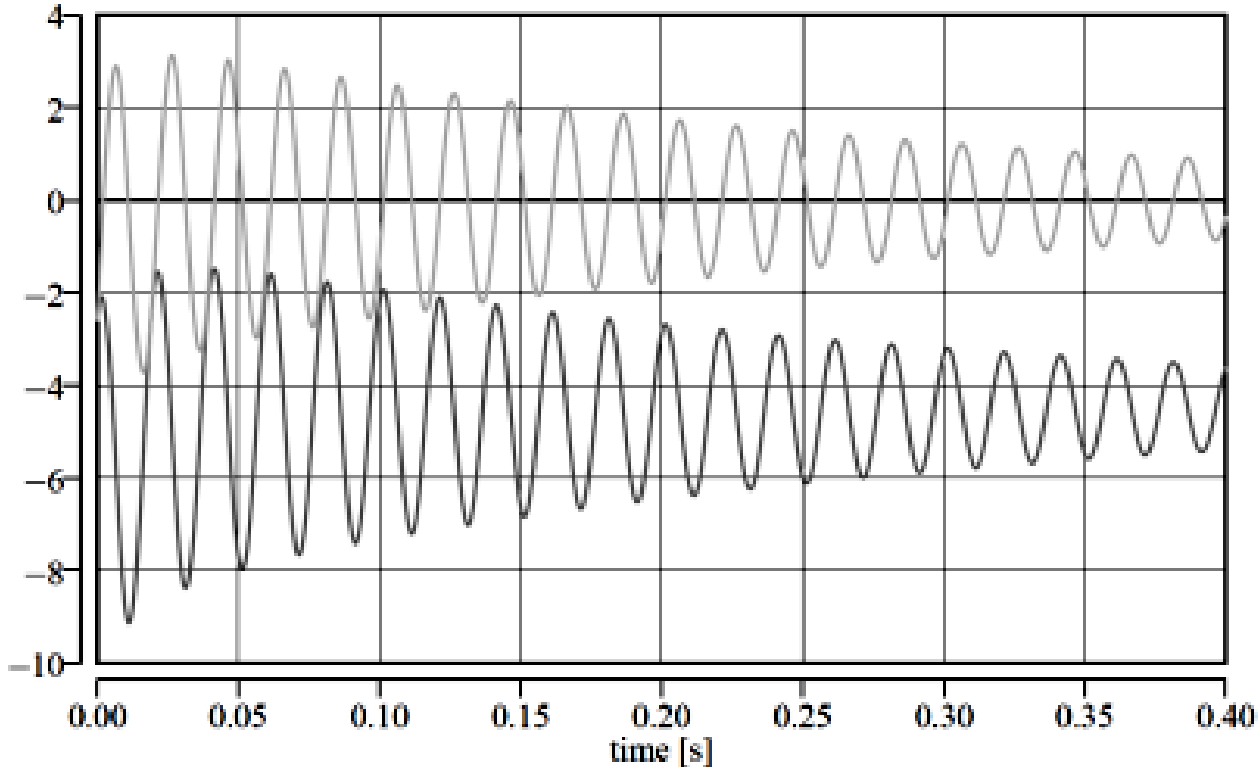
■  $I_{fu}$     
 ■  $I_{fa}$     
 ■  $I_{f\omega}$     
 ■  $I_f$

$$i_d(t) = i_{d[u]} + i_{dhu} + i_{da}'(t) + i_{da}''(t) + i_{d\omega}(t) = i_{d[u]} + i_{dhu} + i_{da}' e^{-\frac{t}{T_d'}} + i_{da}'' e^{-\frac{t}{T_d''}} + i_{dom} e^{-\frac{t}{T_a}} =$$

$$i_d(t) = -\frac{e_{[0]}}{x_d} - u_{q[0]} \left( \frac{x_d' - x_d}{x_d' \cdot x_d} \right) e^{-\frac{t}{T_d'}} - u_{q[0]} \left( \frac{x_d'' - x_d'}{x_d'' \cdot x_d'} \right) e^{-\frac{t}{T_d''}} + \left( \frac{u_{q[0]}}{x_d''} \cos(\omega \cdot t) + \frac{u_{d[0]}}{x_d''} \sin(\omega \cdot t) \right) e^{-\frac{t}{T_a}}$$

$$i_q(t) = i_{q[u]} + i_{qhu} + i_{qa}''(t) + i_{q\omega}(t) = i_{q[u]} + i_{qhu} + i_{qa}'' e^{-\frac{t}{T_q''}} + i_{q\omega} e^{-\frac{t}{T_a}} =$$

$$i_q(t) = -u_{q[0]} \left( \frac{x_q'' - x_q}{x_q'' \cdot x_q} \right) e^{-\frac{t}{T_q''}} + \left( \frac{u_{q[0]}}{x_q} \sin(\omega \cdot t) - \frac{u_{d[0]}}{x_q} \cos(\omega \cdot t) \right) e^{-\frac{t}{T_a}}$$



■ Id ■ Iq

$$i_A(t) = i_d(t)\cos(\vartheta) + i_q(t)\sin(\vartheta) =$$

$$= \left( i_{d[u]} + i_{dhu} + i_{da}' e^{-\frac{t}{T_d'}} + i_{da}'' e^{-\frac{t}{T_d''}} + i_{dom} e^{-\frac{t}{T_a}} \right) \cos(\vartheta) + \left( i_{q[u]} + i_{qhu} + i_{qa}'' e^{-\frac{t}{T_q''}} + i_{qom} e^{-\frac{t}{T_a}} \right) \sin(\vartheta)$$

$$i_A(t) = - \left[ \frac{e_{[0]}}{x_d} + \left( \frac{e_{q[0]}'}{x_d'} - \frac{e_{[0]}}{x_d} \right) e^{-\frac{t}{T_d'}} + \left( \frac{e_{q[0]}''}{x_d''} - \frac{e_{q[0]}'}{x_d'} \right) e^{-\frac{t}{T_d''}} \right] \cos(\omega \cdot t + \vartheta_0)$$

$$+ \left( u_{q[0]} \cos \vartheta_0 - u_{d[0]} \sin \vartheta_0 \right) \frac{x_d'' + x_q''}{2x_d'' \cdot x_q''} e^{-\frac{t}{T_a}} + \left[ u_{q[0]} \cos(2\omega \cdot t + \vartheta_0) + u_{d[0]} \sin(2\omega \cdot t + \vartheta_0) \right] \frac{x_d'' + x_q''}{2x_d'' \cdot x_q''} e^{-\frac{t}{T_a}}$$

