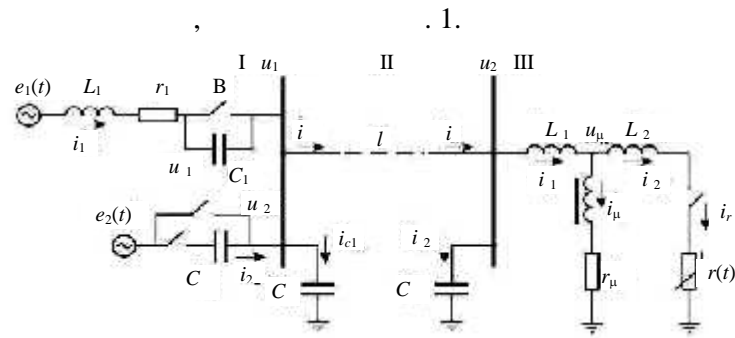


[2].

[3, 4].



. 1.

$$e_1(t) = e_2(t) = U \sin \omega t,$$

$L_2, r_\mu, l, L_1, r_1,$
 $i_1, i_2, i, i_k, i_1, i_2, i_\mu, i_r,$
 $r(t),$
 I, II, III

• :
 • I
 : $L_1^{-1} \neq 0; C^{-1} = 0;$, $L_1^{-1} = 0,$
 •
 l - II

$h = v\tau,$
 v -
 ; $h, \tau -$;
 • , $r(t) -$ III
 , $r(t)$, $L_2^{-1} = 0;$
 •
 $r(t).$
 $r(t)$

I :

$$\begin{aligned}
 \frac{di_1}{dt} &= L_1^{-1}[e_1(t) - r_1 i_1 - u_{c1} - u_1]; \\
 \frac{du_{c1}}{dt} &= C_1^{-1} i_1 \quad C_1^{-1} \neq 0; i_1 \neq 0; \\
 \frac{du_{c2}}{dt} &= C^{-1} i_2 \quad C = 0; i_2 = 0; \\
 \frac{du_1}{dt} &= C^{-1} i_{c1},
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 e_2(t) &= u_{c2} + u_1; \\
 i + i_{c1} &= i_1 + i_2,
 \end{aligned}$$

i -

II

[5]:

$$\begin{aligned}
 u_d - u_p + z(i_d - i_p) + h \left[z\varphi \left(\frac{\partial u_c}{\partial t} i_c \right) + f \left(\frac{\partial i_c}{\partial t} i_c \right) \right] &= 0; \\
 u_c + u_q + z(i_d - i_q) + h \left[f \left(\frac{\partial i_c}{\partial t} i_c \right) - z\varphi \left(\frac{\partial u_c}{\partial t} i_c \right) \right] &= 0,
 \end{aligned} \tag{2}$$

$$z = (L_0 C_0^{-1})^{0.5} - ; L_0, 0 -$$

$$; u_d, u_p, u_q, u_c, i_d, i_p, i_q, i_c -$$

$$x = 0, x = l, t = 0 \quad t$$

$$(x, t), (x - h, t - \tau), (x + h, t - \tau), (x, t - \tau); l, h,$$

$$\tau - , \tau = (L_0 0)^{0.5} h; f\left(\frac{\partial i_c}{\partial t_1} i_c\right);$$

$$\Phi\left(\frac{\partial u_c}{\partial t_1} u_c\right) - , -$$

(2)

n-

$$f\left(\frac{\partial i_c}{\partial t_1} i_c\right)$$

[5]

[6].

$$\Phi\left(\frac{\partial u_c}{\partial t} u_c\right) -$$

[7],

[8].

$$u_s = f\left(\frac{\partial i_c}{\partial t_1} i_c\right) = Z_n i_d - Z_n \sum_{k=1}^n Z_k i_{fk}; \quad (3)$$

$$i = \Phi\left(\frac{\partial u_c}{\partial t} u_c\right) = G\left[u_d\left(1 - \frac{u_3}{|u_d|}\right)\right] - G\left[u_f\left(1 - \frac{u_3}{|u_f|}\right)\right] - \sigma_k i_k(t - 2\tau), \quad (4)$$

$Z_n, Z_k, G, \sigma_k -$,

[9]; 3-

(2)

$$u_d \quad i_d \quad d(x, t) \quad u_p, u_q$$

$$i_p, i_q \quad p(-h, t - \tau); q(+h, t - \tau) -$$

$$d \quad i_d.$$

d -

p q , -

4τ . -

p q -

d . u i [10] -

$$\begin{aligned} \bar{u}_{A,B,C}(h,0) &= [5u_{A,B,C}(h,0) + 2u_{A,B,C}(3h,0) + u_{A,B,C}(5h,0)]/6; \\ \bar{u}_{A,B,C}(2h,0) &= [u_{A,B,C}(h,0) + u_{A,B,C}(3h,0) + u_{A,B,C}(5h,0)]/3; \\ \bar{u}_{A,B,C}(nh,0) &= [5u_{A,B,C}(nh,0) + 2u_{A,B,C}((n-1)h,0) + u_{A,B,C}((n-2)h,0)]/6; \\ \bar{i}_{A,B,C}(h,0) &= [5i_{A,B,C}(h,0) + 2i_{A,B,C}(3h,0) + i_{A,B,C}(5h,0)]/6; \\ \bar{i}_{A,B,C}(3h,0) &= [i_{A,B,C}(h,0) + i_{A,B,C}(3h,0) + i_{A,B,C}(5h,0)]/3; \\ \bar{i}_{A,B,C}(nh,0) &= [5i_{A,B,C}(nh,0) + 2i_{A,B,C}((n-1)h,0) + i_{A,B,C}((n-2)h,0)]/6, \end{aligned} \quad (5)$$

. 1, 2.

$(n = 10) \quad t = 0,48 \cdot 10^{-1}$ l

	u_{A^-}	\bar{u}_{A^-}	u_{B^-}	\bar{u}_{B^-}	u_{C^-}	\bar{u}_{C^-}	i_{A^-}	\bar{i}_{A^-}	i_{B^-}	\bar{i}_{B^-}	i_{C^-}	\bar{i}_{C^-}
0	0,58718	0,58718	2,2321	2,2321	2,2321	2,2321	6,7280	6,7275	0	$-0,39299 \cdot 10^{-4}$	0	$-0,10095 \cdot 10^{-3}$
1	0,58856	0,58845	2,2327	2,2336	2,2327	2,2346	7,2181	7,2191	-0,58735	-0,58727	-0,58750	-0,58730
2	0,58990	0,58988	2,2331	2,2321	2,2331	2,2351	7,7113	7,7122	-1,1745	-1,1744	-1,1744	-1,1743
3	0,59119	0,59128	2,2334	2,2354	2,2334	2,2364	8,2073	8,2084	-1,7614	-1,7604	-1,7611	-1,7622
4	0,59244	0,59242	2,2337	2,2326	2,2337	2,2346	8,7064	8,7074	-2,3483	-2,3453	-2,3480	-2,3471
5	0,59363	0,59342	2,2338	2,2348	2,2338	2,2348	9,2085	9,2095	-2,9353	-2,9305	-2,9352	-2,9333
6	0,59478	0,59487	2,2338	2,2358	2,2338	2,2378	9,7134	9,7144	-3,5229	-3,5231	-3,5228	-3,5230
7	0,59589	0,59577	2,2337	2,2387	2,2337	2,2357	10,221	10,252	-4,1110	-4,1113	-4,1110	-4,1112
8	0,59694	0,59693	2,2335	2,2385	2,2335	2,2345	10,732	10,703	-4,7000	-4,7003	-4,7000	-4,7004
9	0,59795	0,59794	2,2332	2,2382	2,2332	2,2352	11,246	11,247	-5,2899	-5,2904	-5,2901	-5,2905
10	0,59892	0,59892	2,2328	2,2328	2,2328	2,2328	11,763	11,762	-5,8813	-5,8811	-5,8813	-5,8811

$$(n = 10) \quad t = 0,6481 \cdot 10^{-1}$$

/	u_{A^-}		u_{B^-}		u_{C^-}		i_{A^-}		i_{B^-}		i_{C^-}	
	u_{A^-}	\bar{u}_{A^-}	u_{B^-}	\bar{u}_{B^-}	u_{C^-}	\bar{u}_{C^-}	i_{A^-}	\bar{i}_{A^-}	i_{B^-}	\bar{i}_{B^-}	i_{C^-}	\bar{i}_{C^-}
0	0,95062	0,95061	-1,2947	-1,2947	-1,2947	-1,2947	-2,9053	-2,9051	0	$0,52288 \cdot 10^{-4}$	0	$0,52286 \cdot 10^{-4}$
1	0,95020	0,95027	-1,2949	-1,2939	-1,2949	-1,2939	-2,8363	-2,8369	0,11459	0,11449	0,11467	0,11456
2	0,94980	0,94971	-1,2951	-1,2955	-1,2951	-1,2981	-2,7690	-2,7696	0,22887	0,22880	0,22902	0,22892
3	0,94942	0,94953	-1,2953	-1,2962	-1,2952	-1,2932	-2,7034	-2,7040	0,34295	0,34291	0,34307	0,34306
4	0,94905	0,94906	-1,2954	-1,2963	-1,2954	-1,2923	-2,6396	-2,6402	0,45691	0,45691	0,45708	0,45708
5	0,94870	0,94881	-1,2954	-1,2954	-1,2954	-1,2934	-2,5775	-2,5780	0,57088	0,57092	0,57110	0,57114
6	0,94837	0,94857	-1,2955	-1,2975	-1,2955	-1,2924	-2,5170	-2,5176	0,68496	0,68507	0,68525	0,68535
7	0,94804	0,94805	-1,2955	-1,2934	-1,2955	-1,2974	-2,4582	-2,4588	0,79936	0,79953	0,79970	0,79981
8	0,94774	0,94784	-1,2954	-1,29,64	-1,2954	-1,2954	-2,4011	-2,4017	0,91425	0,91444	0,91449	0,91471
9	0,94745	0,94705	-1,2953	-1,2950	-1,2953	-1,2983	-2,3457	-2,3462	1,0297	1,0299	1,0299	1,0301
10	0,94717	0,94717	-1,2952	-1,2952	-1,2952	-1,2952	-2,2918	-2,2915	1,1459	1,1458	1,1459	1,1458

(2)

(2)

III II :

$$\frac{di}{dt} = L_1^{-1}(u_2 - u_\mu);$$

$$\frac{di_{T_2}}{dt} = L_{T_2}^{-1}[u_\mu - r(t)i_{T_2}] \quad L_{T_2}^{-1} = 0; \quad i_{T_2} = 0; \quad (6)$$

$$\frac{di_{c_2}}{dt} = C_T^{-1}i_{c_2};$$

$$\frac{d\psi}{dt} = (u_\mu - r_\mu i_\mu),$$

$$i_{c_2} = \dot{i}_k - i_{T_1}; \quad i_{T_1} = i_\mu - i_{T_2}; \quad i_\mu = f(\psi(t)).$$

[11].

[12].

$r(t)$,

[4]:

$$r(t) = \frac{u_r}{i_r} = u_r i_r^{-1} \quad r(t) = r_0 |i_r|^{\alpha-1}, \quad (7)$$

u_r -

$r(t)$; r_0 -

$$i_2 = 1 \text{ A},$$

$r(t)$.

330

-330.

$l = 100 \dots 300$.

$r(t)$

1

$r(t)$

$0,5U$,

2,

[1]

$$u_2 = e_1(t) \frac{C}{C + C}. \quad (8)$$

$= 300$,

1 ,

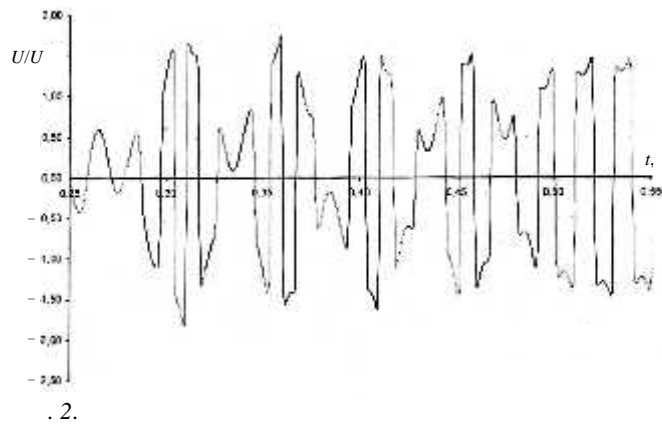
U , $U =$
 $r_0 = 0,5U$ $r_1 = 150000$,

r_0

$r_0 = 0,2$,

. 2

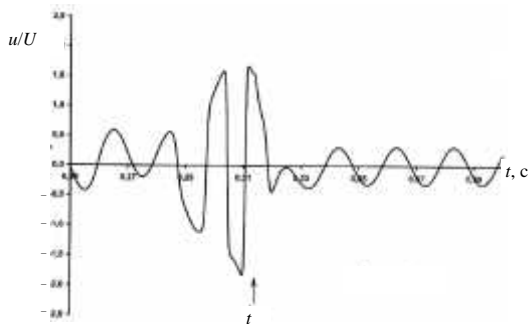
$1,6U$.



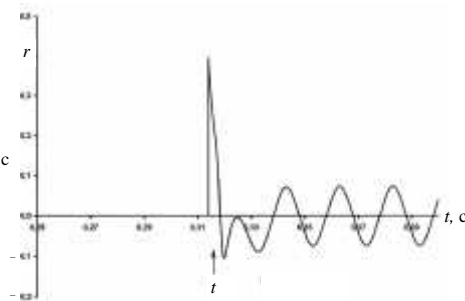
$$\alpha = 0,9 \quad t = 0,314 \quad r_0 \approx 0,2$$

. 3.

0,004 .



. 3.



. 4.

$$t = 0,353$$

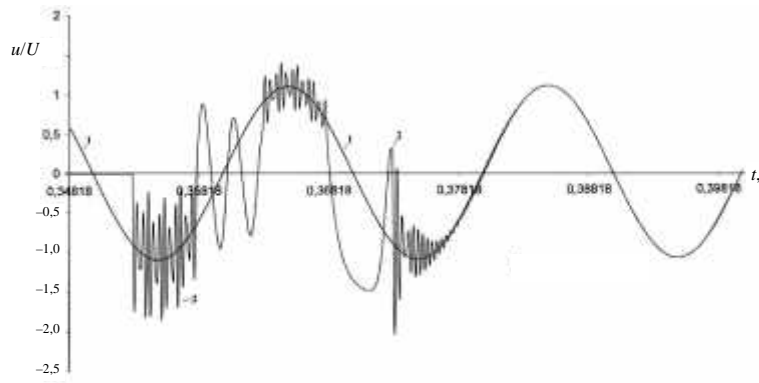
; 2 -

$$2U \quad t = 0,358$$

1,5U

$t = 0,373$

2,5U



. 4.

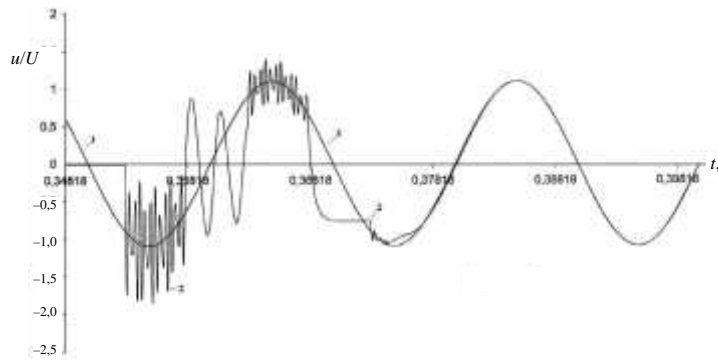
$r(t)$,

. 5,

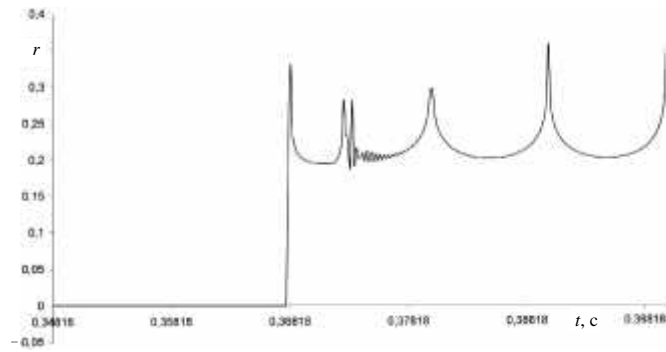
$r(t)$ -

. 6.

$r(t)$.
 $r(t)$



. 5.



. 6.

, ,
 , ,
 $r(t)$ $r(t)$

α

$r(t)$

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