

« »

«Утверждаю»

-

_____ «09» 2021 .

1. .27

: 11.03.01

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- 2,3

- 4,5

- 9; - 324

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«02» 2021 .,

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2021

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3.

« » « ».

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RC

RL

LR-

RC-

LC-

1. Introduction
2. Literature Review
3. Methodology
4. Results
5. Discussion
6. Conclusion

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CR-

RC-

RC-

CR-

Z-

Z-

Z-

4.

/						
				-	-	-
4						
1.		48	12	6	10	20
2.		44	8	4	12	20
3.		30	6	2	10	12
4.		10	2	2	-	6
5.		12	4	2	-	6
	4	144	32	16	32	64
5						
1.		60	12	10	22	16
2.		40	6	10	10	14
3.		12	2	4	-	6
4.		28	6	8	-	14
5.		13	6	-	-	7
6.		27	-	-	-	27
	5	180	32	32	32	84
		324	64	48	64	148

5.

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LC-

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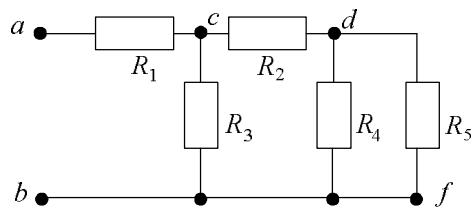
1.

1.

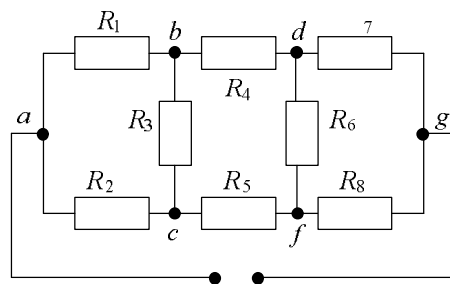
2.

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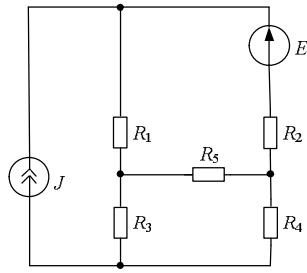
, , , $R_1=6$; $R_2=5$; $R_3=15$; $R_4=30$; $R_5=6$.



1.

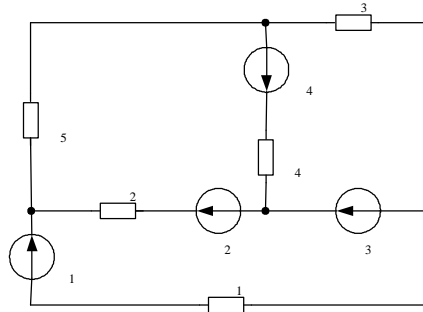


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1.

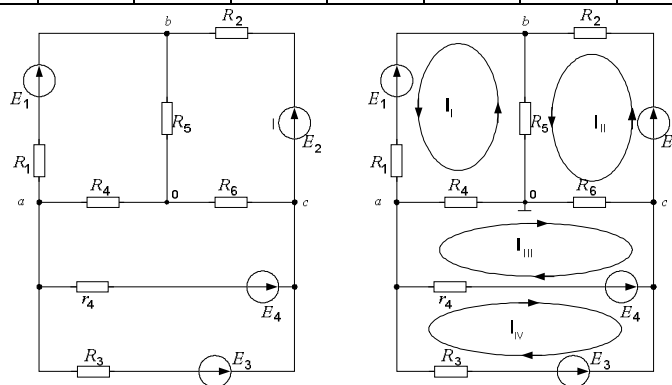
	1	2	3	4	1	2	3	4	1	2	3	4	5
1	100	30	10	6	1	2	3	4	10	10	15	6	5
2	80	40	20	15	1	2	3	4	10	10	15	6	5
3	85	20	30	40	1	2	3	4	10	10	15	6	5
4	60	40	40	20	1	2	3	4	10	10	15	6	5
5	30	30	30	30	1	2	3	4	10	10	15	6	5



2.

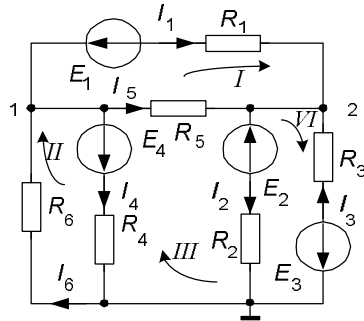
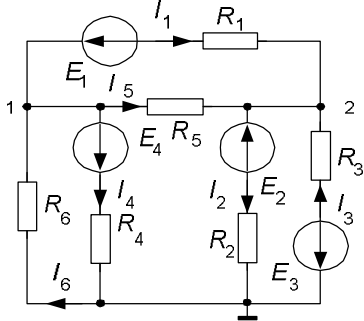
0.

	1	2	3	4	4	1	2	3	4	5	6
1	85	84	5	12	30	8	10	10	10	10	4
2	100	40	20	20	30	8	10	10	10	10	4
3	60	60	30	30	30	8	10	10	10	10	4
4	50	30	80	60	30	8	10	10	10	10	4
5	40	60	70	30	30	8	10	10	10	10	4



3.

	1	2	3	4	1	2	3	4	5	6
1	30	10	200	56	20	30	6	8	15	40
2	40	30	20	60	20	30	6	8	15	40
3	20	30	30	30	20	30	6	8	15	40
4	50	40	70	40	20	30	6	8	15	40
5	25	35	10	50	20	30	6	8	15	40



3.

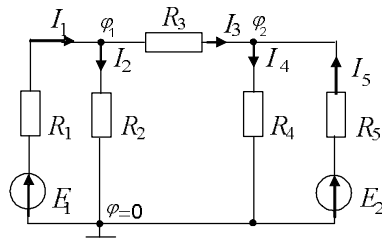
1.

2.

1.

$i_1=2$; $i_2=10$; $i_3=10$; $i_4=5$; $i_5=2$.

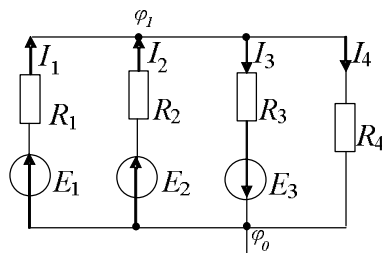
, $i_1=24$; $i_2=12$;



1.

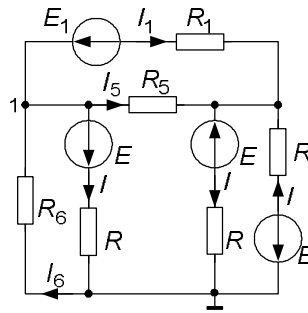
; $i_2=10$; $i_3=20$; $i_4=10$; $i_1=12$; $i_2=24$; $i_3=48$.

4, $i_1=5$



2.

	1	2	3	4	1	2	3	4	5	6
1	30	10	200	56	20	30	6	8	15	40
2	20	20	100	70	20	30	6	8	15	40
3	10	10	10	10	20	30	6	8	15	40
4	150	40	30	200	20	30	6	8	15	40
5	15	15	30	40	20	30	6	8	15	40



4.

- 1.
- 2.

1.

$3,2 \pm j1,25$	–	$3,44 \exp(\pm j21^0)$	$3,2 - j0,125$	–	$3,2 \exp(-2,2^0)$
$1,25 \pm j3,2$	–	$3,44 \exp(\pm j69^0)$	$0,125 + j3,2$	–	$3,2 \exp(j88^0)$
$-3,2 \pm j1,25$	–	$3,44 \exp(\pm j159^0)$	$-0,125 + j3,2$	–	$3,2 \exp(92^0)$
$-1,25 \pm j3,2$	–	$3,44 \exp(\pm j111^0)$	$0,32 - j1,25$	–	$1,29 \exp(-76^0)$
$3,2 + j12,5$	–	$12,9 \exp(\pm j76^0)$	$23 + j0,06$	–	$23 \exp(0,15^0)$

$32(\exp \pm j19^0)$	–	$30,3 \pm j10,4$	$32(\exp 92^0)$	–	$-1,12 + j32$
$32(\exp \pm j71^0)$	–	$10,4 \pm j30,3$	$32(\exp -177^0)$	–	$-32 - j1,7$
$32(\exp \pm j161^0)$	–	$30,3 \pm 10,4$	$7,3(\exp -87^0)$	–	$0,38 - j7,3$
$-32(\exp \pm j2^0)$	–	$-32 \pm 1,1$	$150(\exp 191^0)$	–	$-147 - j29$

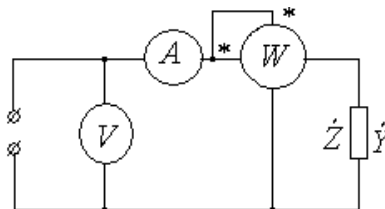
1.

$() = 100\sqrt{2} \sin(\omega t + 15^0)$ B; $() = 5\sqrt{2} \sin(\omega t - 20^0)$

2.

$\varphi < 0$.

\dot{Z}



3.

$= 0,63$

50 ?

1	220	50	10	0,63
2	380	50	10	0,63
3	220	400	10	0,63
4	220	50	50	0,63
5	220	50	10	0,1

5.

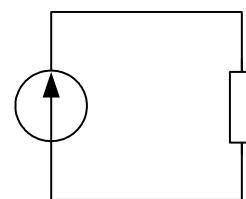
- 1.
- 2.

1.

$(i) = 100\sqrt{2} \sin(\omega t + 15^\circ) \text{ B}; \quad (u) = 5\sqrt{2} \sin(\omega t - 20^\circ)$

1.

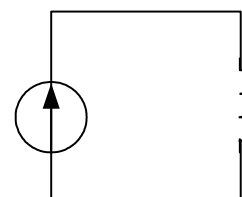
1	100	50	100
2	200	50	100
3	100	400	100
4	100	50	500
5	100	400	500



2.

L

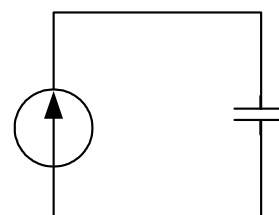
1	100	50	100
2	200	50	100
3	100	400	100
4	100	50	10
5	100	400	10



3.

C

1	100	50	10
2	200	50	10
3	100	400	10
4	100	50	1
5	100	400	1



6.

- 1.
- 2.
- 3.
- 4.

1.

$=142$
 $=22$

$=0,263$

1. 1

1	2	3	4	5	6
=1	=0,4	=0,3	=50	=50	=100

2. 1

1

3. 1

1	2	3	4	5
=50	=500	=50	=5	=50
=	=	=0	=0	=50

7.

1.

2.

1.

=5

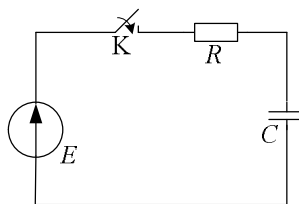
=5

=5

1.

2.

3.



1.

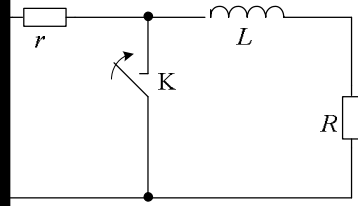
1.

2.

3.

1	1,2	5,1	4
2	10	5,1	4
3	1,2	1	4
4	1,2	5,1	10
5	2	100	4

$\omega = 0,1$; $\omega = 2$; $\omega = 100$ B.



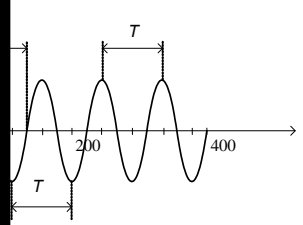
,2.

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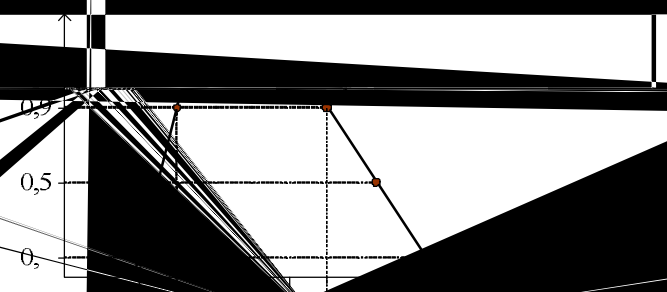
()

, - ,).



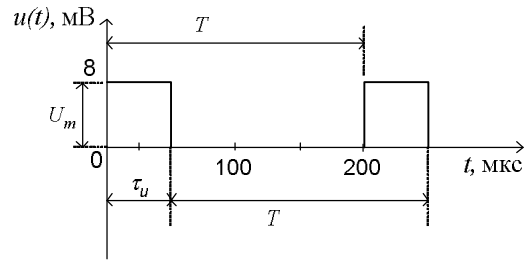
()

).



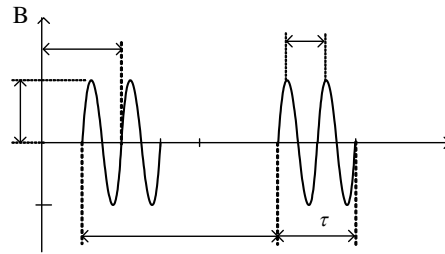
3.

() (. .) (,).



4.

() (. .) : , , .



3.

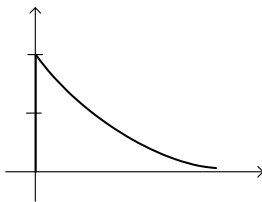
1.

2.

1.

1.

) : ; = . (.)

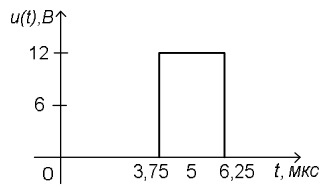


2.

: ; = . (. .)

3.

(. .) , : ; ; .



4.

- 1.
- 2.

1. 75 ; $200(1+0,8\cos 4 \cdot 10^3) \cos 6 \cdot 10^3$;

1. $() = (1 + 0.25 \cos(10^2 + 30)) \cdot \cos(10^5 + 60)$.

2. $= 30$; $\tau_1 = 2/3$; $\tau_2 = 1/3$, 1 .

3. $f = 75$; $f = 75$; $U = 100$;
 $= 15$;

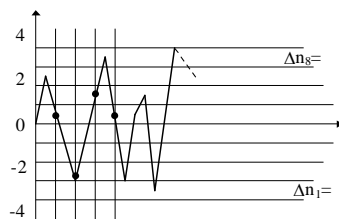
4 P_{max} , $P_0 = 4$, $M = 0,8$.

5.

- 1.
- 2.

1.

1. $(.$



2.

		σ	
			()
		$\sqrt{\quad}$	

3.

()

4.

6,7.

1.

2.

1.

CR-

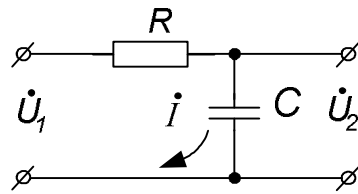
1.

),

RC-

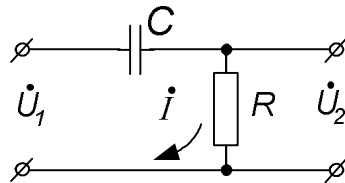
(.).

(



2.

- (.).



3.

4.

CR-

8,9.

1.

CR-

2.

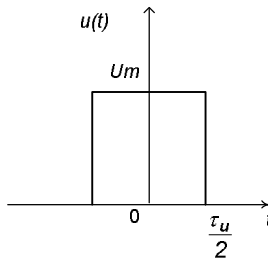
RC-

1.

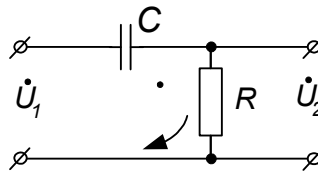
1.

U_m .

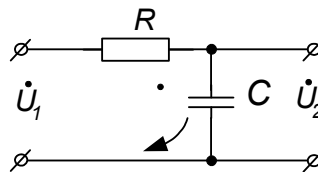
τ_u



2. RC- U_m τ_u
3. RL- U_m τ_u
4. LR- U_m τ_u
5. CR- U_m τ_u
- $\tau_u=1$ $U_m=5$
- : $R = (20+0,01n)$, $C = (50+0,1n)$



6. RC- $U_m=5$
- $\tau_u=1$: $R = (20+0,01n)$, $C = (50+0,1n)$

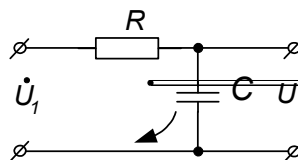


10.

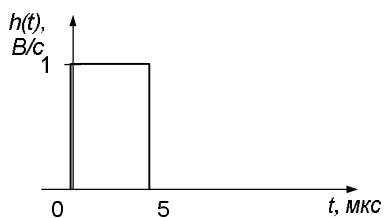
1. RC- .
2. CR- .

1. ?

1. RC- $() = -$.



2. (. .)



3. RC-

τ_u

U_m

4. CR-

U_m

τ_u

11.

1.

2.

1.

)

(

2.

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(

1.

:

$$s^3 + s^2 + 6s + 4 = 0.$$

2.

RC-

$\beta = 1,$

$$= \frac{-}{s + \tau},$$

() = .

-

, $\tau =$ -

3.

:

$$= \frac{-}{s + \tau} = \frac{-}{s + \tau}$$

12,13.

1.

2.

Z-

3.

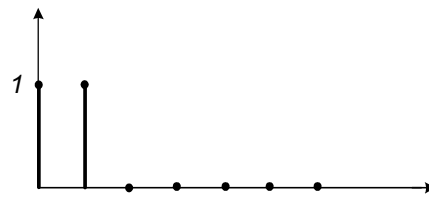
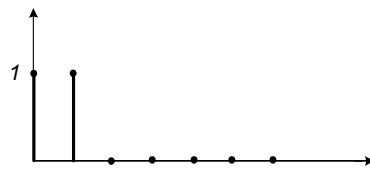
1.

(Z-)

{ } = {1, 0, 0, ...}.

1. (Z-) $\{ \} = \{1, 1, 1, 0, 0, \dots\}$
2. (Z-) $\{ \} = \{1, 1, 1, 1, \dots\}$
- (« »).
3. (Z-) $\{ \} = \{1, \dots, \dots, \dots\} (| | < 1)$.
4. (Z-) $() = \frac{^3 - 2 \cdot ^2 + -1}{3}$

5. $= (1, 1, 0, 0, 0, \dots)$ (1) $= (1, 1, 0, 0, \dots)$
- (.).



14,15,16.

1.

2.

3.

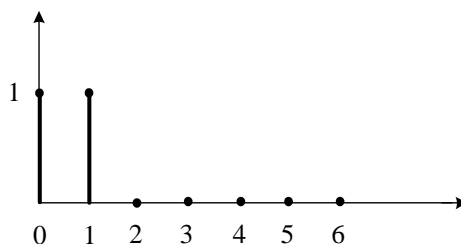
1.

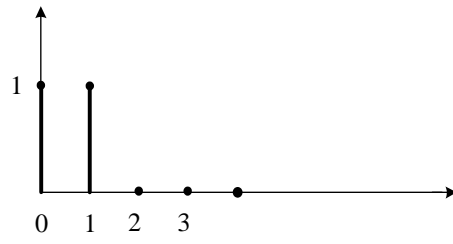
Z-

1.

$= (1, 1, 0, 0, 0, \dots)$

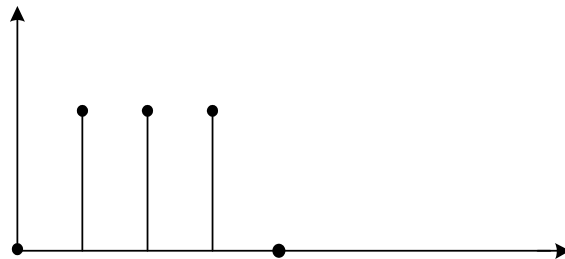
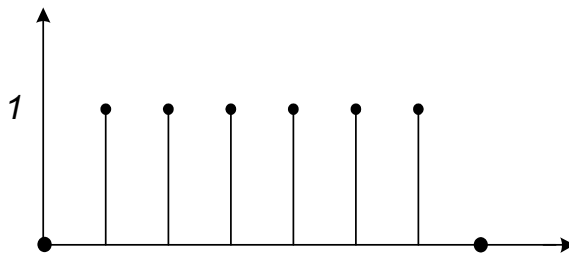
(1) $= (1, 1, 0, 0, \dots)$ (.).





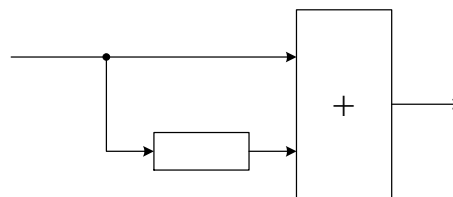
2. Z-

3.



4.

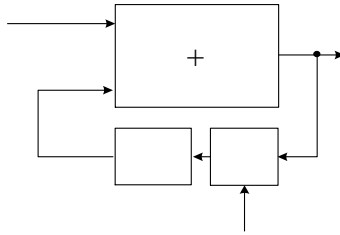
(. .).



T

5.

<1 (.).



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1) : - -1 , ,
2) : ,
3) :
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4. : ,

2.

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— (,)
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-1. :

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5. , .

6. .

7. .

8. ()

3.

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— (,)

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— : - -1.

1. :

2. .

1. :

2. .

3. (UR(f), UL(f), UC(f)) .

4. .

5. .

5. ?

6. ?

1.

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3. ?
4.
5.

3.

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- 1.
- 2.

- 1.
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- 3.
- 4.
- 5.

1.

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- 1)
- 2)
- 3)
- 4)

1)

2)

3)

4)

5)

6)

2.

1)

2)

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1. .
2. .

6.

6.1.

1. ()

1) ,	0,5
2) ,	0,5
3) , , ,	1
4) ,	1
5)	1
()	- 5

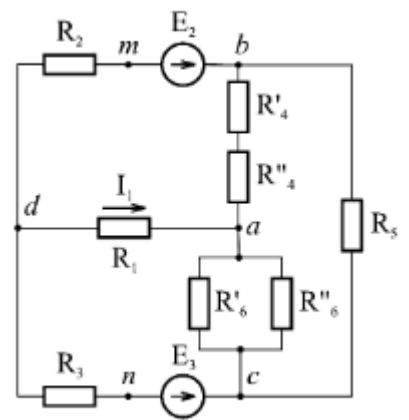
« »-3 ; « »- 3 .

2. (, , , ,)
 « »).

1) (, ,)	1
2)	1
3) ,	1
4)	1
5)	1
()	- 5

« »-3 ; « »- 3 .

3



5.

1.

-) Ri
-) Ri = 0

2.

-) Gi
-) Gi = 0

3.

- (1 /c) i.
- ?
-) uL = 0,5
-) uL = 1

4.

- R = 1 L = 1
- 10³ /c?
-) 45°
-) 45°

5.

- Zi = (1-j) ? E=10
-) P = 12,5
-) P = 25

6.

- L. , R
-) G G C. C. RLC ?

7.

-) = / √-
-) = √- /

8.

- RLC , R, L, C 2 f₀
-) 2 f₀ = R/(2 L)
-) 2 Δ₀ = √- /

9.

- ?
-)
-)

10.

-) , -
-) , -

- 90-100%
- 80-90%
- 70-80%
- 70%

6.2.

1. - 4

1. « » , : ().
2. - « » .
3. « » .
4. 3 .

2. - 5

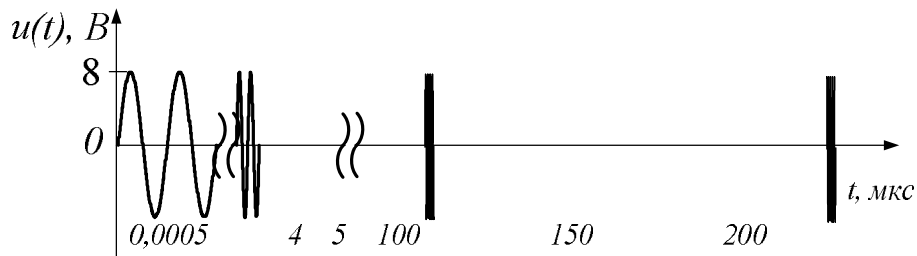
- « » .
- « » , ».
1. , ,
- : ;
- ;
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(« »)		3,3	2000	7500
(« »)		0,45	7000	2800
				/ () ,

(« »)	$\Delta = 1,5$ (↓)	$67+(0,1 \cdot)$	1315	7500
(« »)	$\Delta = 1,5$ (↓)	$8+(0,1 \cdot)$	1282	615

$$u(t) = \begin{cases} 8 \cdot \sin(2\pi \cdot 2000 \cdot 10^6 t) \text{ В,} & 0 \leq \sqrt{a^2 + b^2} t \leq 3,3 \cdot 10^{-6} \text{ нс;} \\ 0, & t < 0, \quad t > 3,3 \cdot 10^{-6} \text{ нс.} \end{cases}$$



$$\frac{8}{40} = 0,2$$

$$= \frac{\left| \sin\left(\frac{\cdot \pi}{\cdot \pi}\right) \right|}{\frac{\cdot \pi}{\cdot \pi}}$$

$$\frac{1}{\tau} = \frac{1}{3,3 \cdot 10^{-6}} \approx 0,3 \cdot 10^6 = 0,3$$

$$\delta = F = 7500$$

$$= 0 \pm \cdot ,$$

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$\beta = 1,$

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