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1.3.	13
1.4.	16
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2.2.	26
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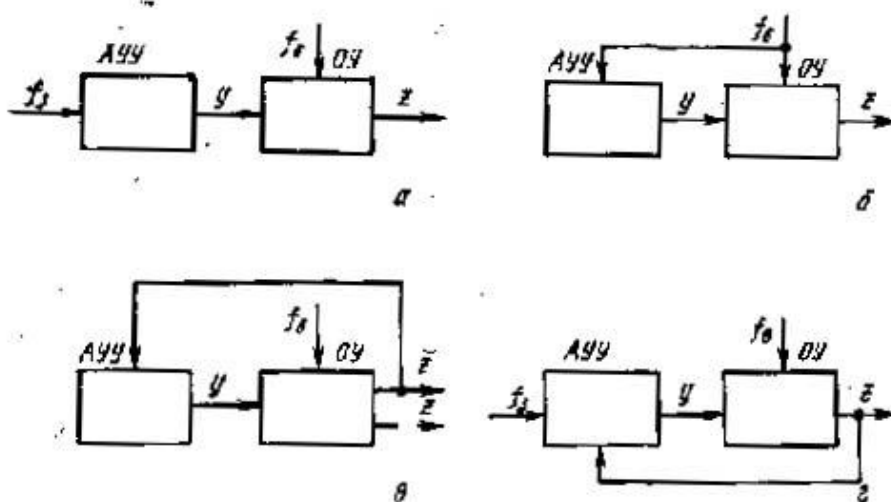
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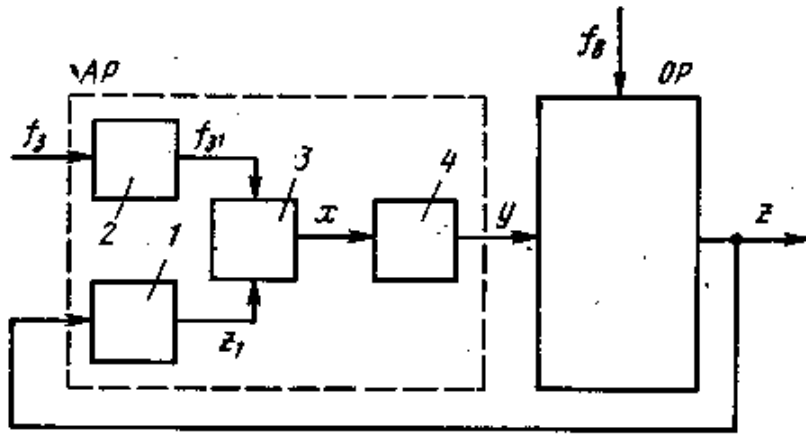
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1.2 -

$f_3$ ,  $Z_1$ ,  $Z$ ,  $f_1$ ,  $Z_1$ ,  $X = f_1 - Z_1$ ,  $X$

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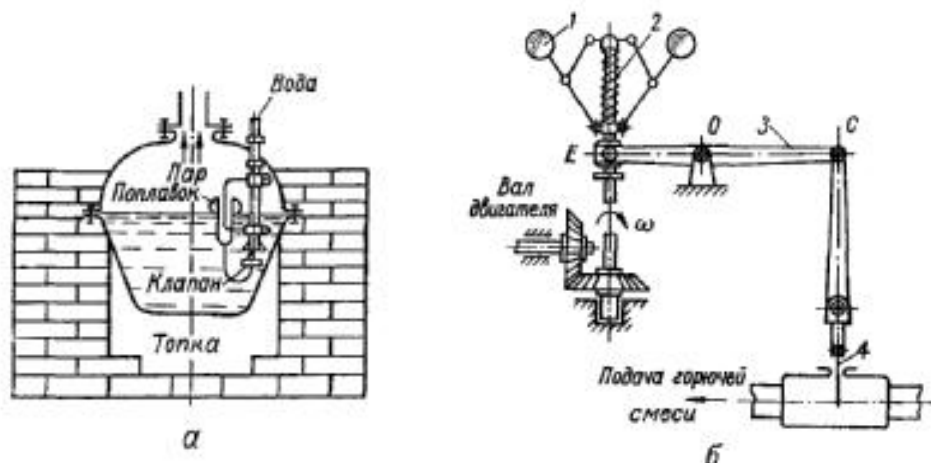
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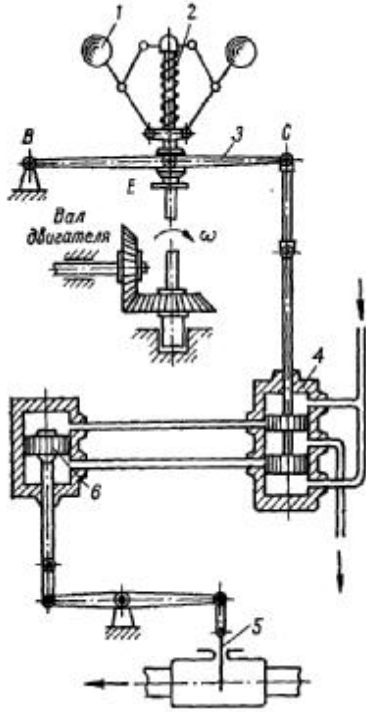
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**W(p)**

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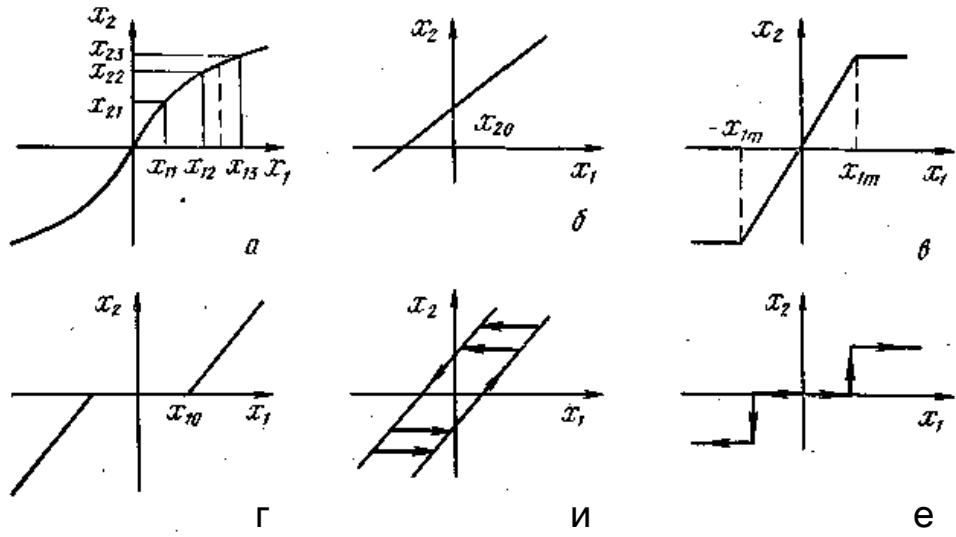
2.

$$2=f(1),$$

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2.1 - ; - ; - ; -  
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$$x_2 = x_{20} + k x_1, \quad (2.1)$$

$$x_{20} - x_2 \quad x_1 = 0, \quad ;$$

k -

2  
1.

$$a_0 \frac{d^2 x_2}{dt^2} < a_1 \frac{dx_2}{dt} < a_2 x_2 \quad \vee \quad b_0 \frac{d^2 x_1}{dt^2} < b_1 \frac{dx_1}{dt} < b_2 x_1 \quad (2.2)$$

(2.2)

$$a_0 p^2 < a_1 p < a_2 \bar{x}_2 \quad \vee \quad b_0 p^2 < b_1 p < b_2 \bar{x}_1 \quad (2.3)$$

$W( )$

$W( )$

(2.3):

$$W \begin{matrix} a_0 p^2 < a_1 p < a_2 \bar{x}_2 \\ a_0 p^2 < a_1 p < a_2 \end{matrix} \quad \vee \quad \begin{matrix} b_0 p^2 < b_1 p < b_2 \\ b_0 p^2 < b_1 p < b_2 \end{matrix} \quad (2.4)$$

(2.4)

$\bar{x}_2( )$ ,

$$\bar{x}_2(p) : NW(p) : \bar{x}_1(p) \quad (2.5)$$

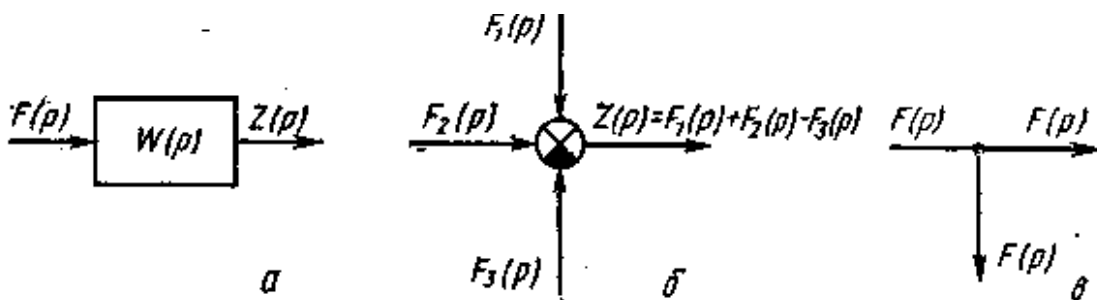
2.2.

$F(p)$

$Z(p)$ ,

. 2.2,

. 2.2, -



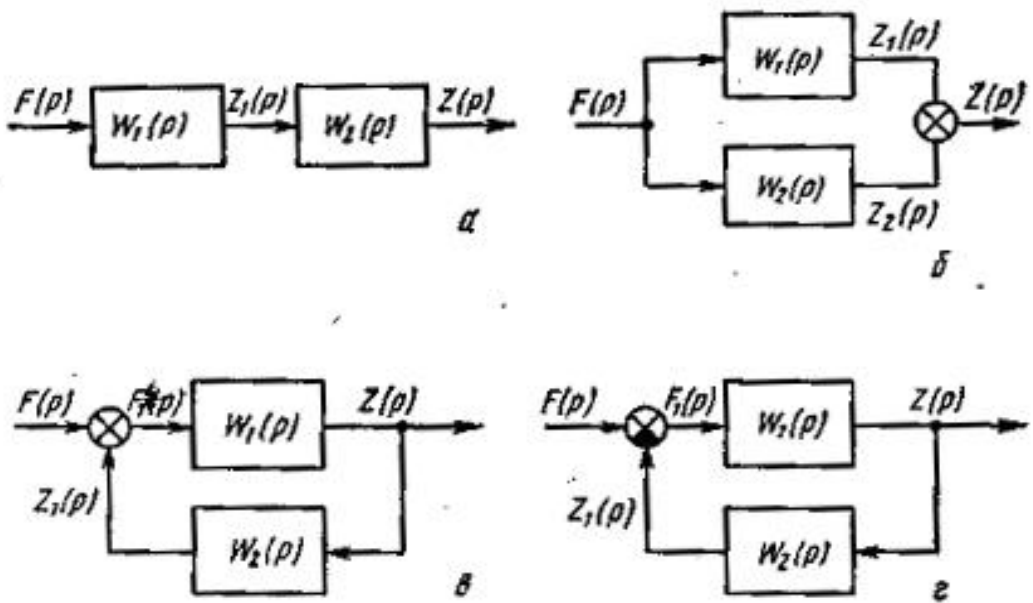
2.2 -

. 2.3, .

$$Z(p) : NW_2(p) : Z_1(p)$$

$$Z_1(p) : NW_1(p) : F(p)$$





2.3 -

$Z_1(p)$ ,

$$Z_1(p) = W_1(p) \cdot F_1(p),$$

$$W_1(p) = W_1(p) \cdot F_1(p) \quad (2.6)$$

$W(p)$

2.3, :

$$Z_1(p) = W_1(p) \cdot F_1(p)$$

$$Z_2(p) = W_2(p) \cdot F_1(p) \quad (2.7)$$

$$Z(p) = Z_1(p) + Z_2(p)$$

$Z_1(p) = Z_2(p)$ ,

$$Z(p) = W_1(p) \cdot F_1(p),$$

$$W(p) = W_1(p) \cdot F_1(p) \quad (2.8)$$

$W(\ )$

. 2.3, , .

$W_1(\ )$

$W_2(\ )$ ,

( . 2.3, ),

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2.3, ).

$$Z^0_p : N W_1^0_p : \bar{n} F_1^0_p :$$

$$Z_1^0_p : N W_2^0_p : \bar{n} Z^0_p : \tag{2.9}$$

$$F_1^0_p : N F^0_p : > Z_1^0_p :$$

$$F_1(\ ) = Z_1(\ ),$$

$$Z^0_p : N W^0_p : \bar{n} F^0_p : ,$$

$$W^0_p : N W_1^0_p : / | 1 < W_1^0_p : \bar{n} W_2^0_p : \bar{n} \tag{2.10}$$

$W(\ )$

(2.10)

$$|W_1(\ )| =$$

(2.10)

$$W(\ ) = 1/W_2(\ ).$$

$$|W_2(\lambda)| = \dots \quad (2.10) \quad W(\lambda) = 0.$$

- $W(\lambda) = k;$
  - $W(\lambda) = k/(\lambda + 1);$
  - $W(\lambda) = 1/(\lambda);$
  - $W(\lambda) = \dots,$
- $k, \dots$

### 3.

#### 3.1.

[1]

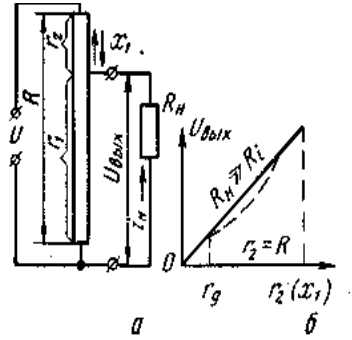
$$X_2 \quad X_1, \quad x_2 = f(x_1).$$

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$$\mathbf{X}_1, \quad \mathbf{U} = f(\mathbf{X}_1).$$



3.1 -

$$\mathbf{X}_1, \quad \mathbf{r}_2 = \mathbf{k}\mathbf{X}_1.$$

$\mathbf{r}_2$

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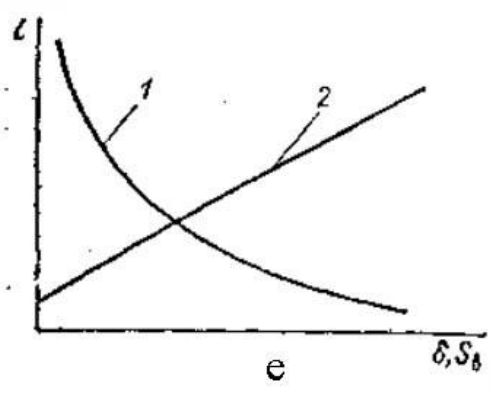
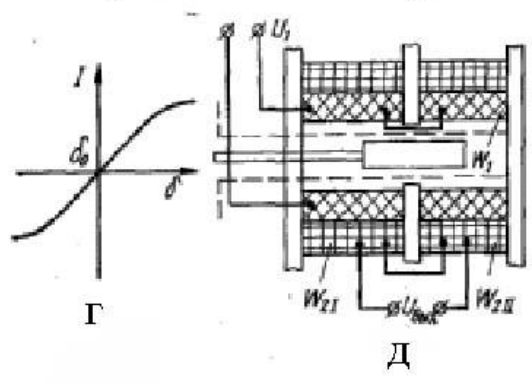
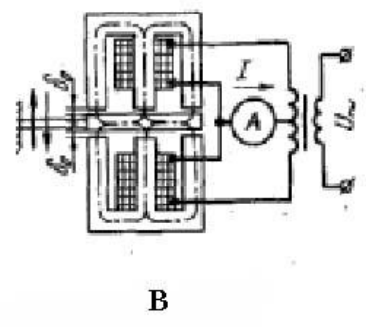
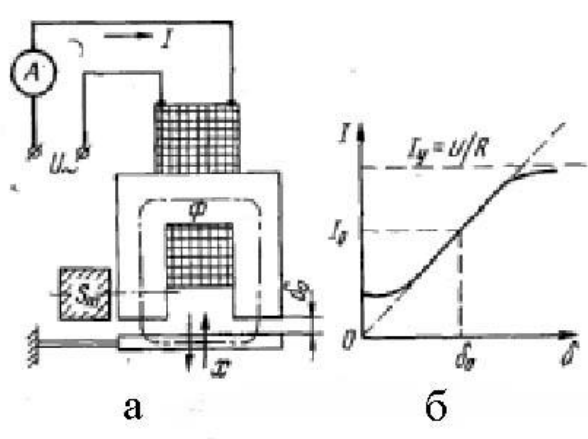
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$\mu_0$  ,

**R<sub>M</sub>**

:

$$R \tilde{O} R N \frac{2u_o}{\sim_o \hat{A}} \quad (3.1)$$

**L (**

):

$$L N \frac{w \hat{W}}{N} N \frac{w^2}{2\delta_0} \hat{\mu}_0 \hat{A}_B, \quad (3.2)$$

**w-**

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**I-**

$$\mathbf{L} = \mathbf{f}(o) \quad ( . 3.2, , 1)$$

(  $o > 1$  )

( 1 ),

- 0,2 .

$$\mathbf{I} \quad ( o), \quad \mathbf{I} = \mathbf{f}( o),$$

. 3.2, .

**0** ,



$I_0$ ,

$$L = f(\dots) \quad (\dots 3.3, \dots 2),$$

$$- 8 \dots - 0,3 \dots$$

**L**

L, ,

$$Z N \sqrt{R_a^2 < X_L^2},$$

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**I**,

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3.3

$W_1$

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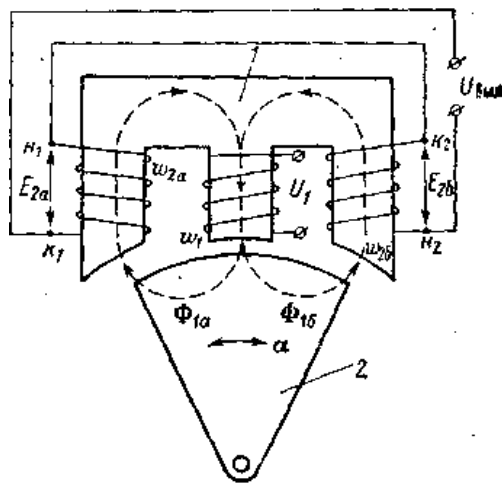
$W_2$

$W_2$

$W_1$  1,

1 1 . 2

( 1 ) ( ) ,



3.3 -

(  $W_2$   $W_2$  )

$$\mathbf{U} = \mathbf{2} - \mathbf{2} ,$$

( . 3.2, )

$$: \quad \mathbf{W}_1 \quad \mathbf{U}_1$$

$$\mathbf{W}_2 \quad \mathbf{W}_2 ,$$

$$\mathbf{U} ,$$

$$\mathbf{U} = \mathbf{1} - \mathbf{2} = 0,$$

$$\mathbf{1} \quad \mathbf{2},$$

$$\mathbf{W}_2 \quad \mathbf{W}_2$$

( . 3.2, ),

$$\mathbf{U} .$$

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3.4.

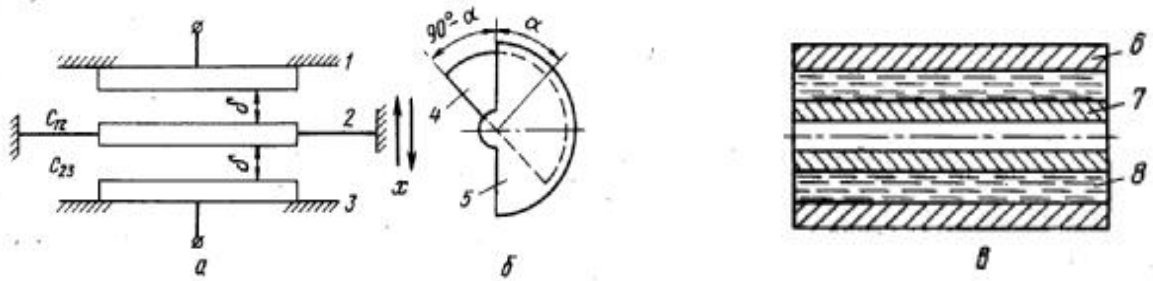
$$= 0 \quad / \quad , \quad (3.3)$$

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(3.3)

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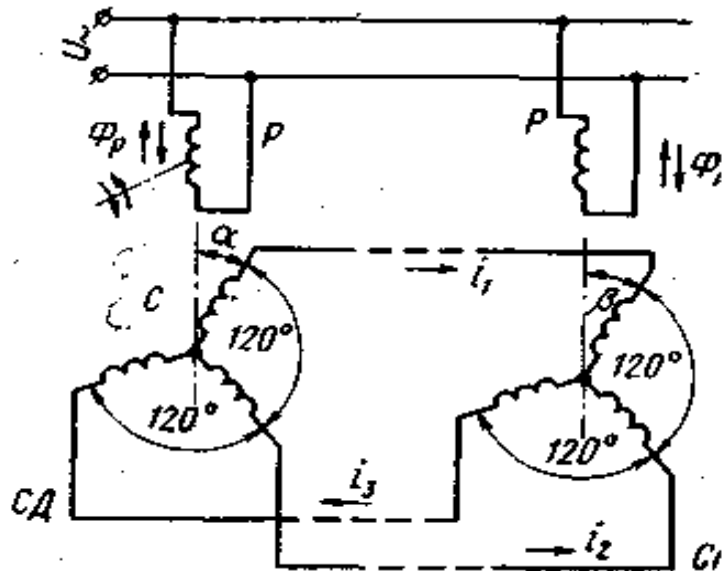
:

1 ... 3

1 ... 3 ,

:

$$\begin{aligned}
 1 &= s ; & 1 &= s ; \\
 2 &= s( +120^\circ); & 2 &= s( +120^\circ); \\
 3 &= s( +240^\circ); & 3 &= s( +240^\circ),
 \end{aligned}
 \tag{3.4}$$



3.5 -

( = )

1...3 1'...3'

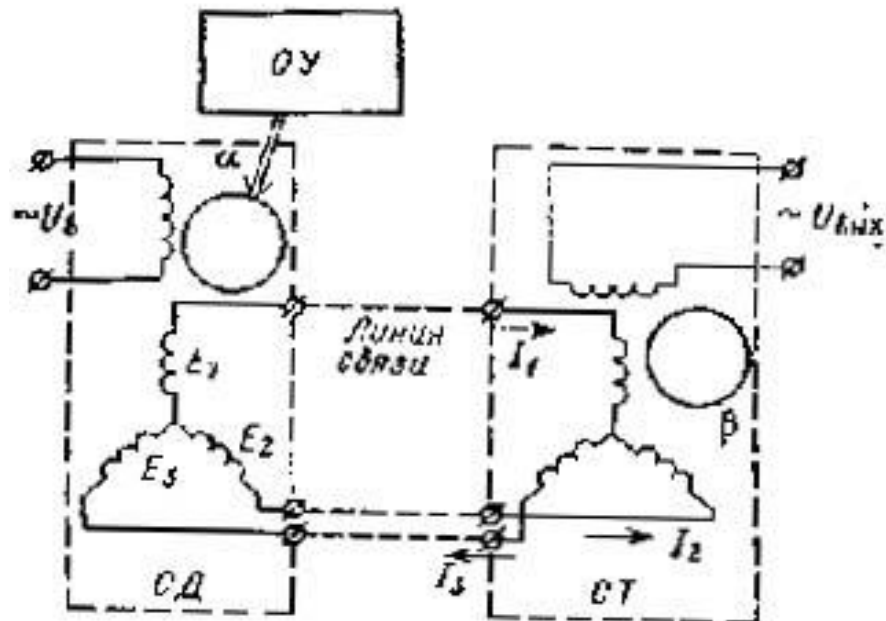
$$(I_1 = I_2 = I_3 = 0).$$

= -

( 3.6)

$E_1 = E \cos \omega t$  ;  $E_2 = E \cos(\omega t + 120^\circ)$  ;  $E_3 = E \cos(\omega t + 240^\circ)$  ,  
 1, 2, 3 –

$I_1, I_2, I_3$  , 1, 2, 3.



3.6 –

$E = E \cos \omega t$  ,

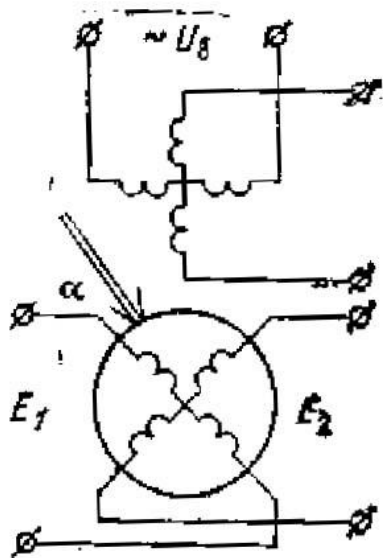
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90°. = s (90° - ) = sin .

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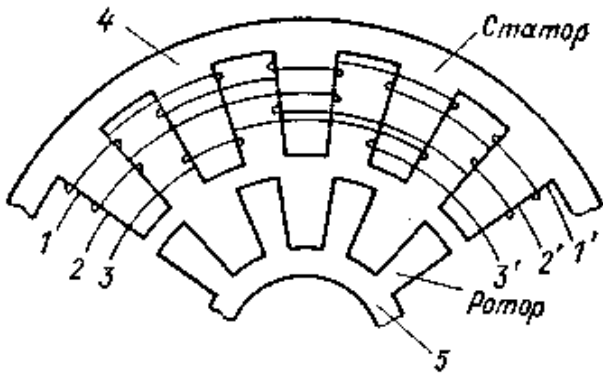
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$\pm 14^\circ$ ,  $-\pm 60^\circ$ .

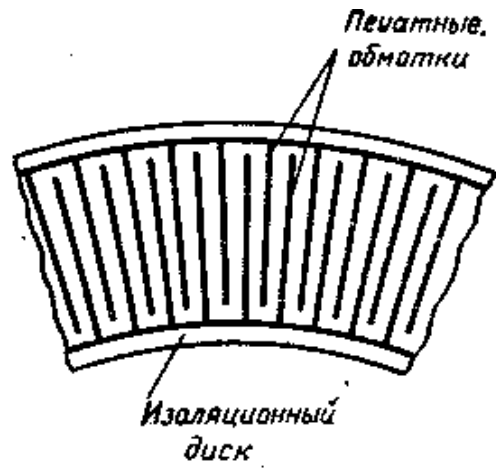
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 $4/3$   $4/5$ .  $4( \cdot 3.8)$   
 1-1' 2-2' 3-3'.

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 5 1/4 .



3.8-



3.9-

256.

$2^n$  ( $n = 1, 2, 3, \dots$ ): 32; 64; 128;

$$E = E \cos \theta, \quad E = E \cos 0^\circ; \quad Z_p = Z_p - \dots$$

128 256,

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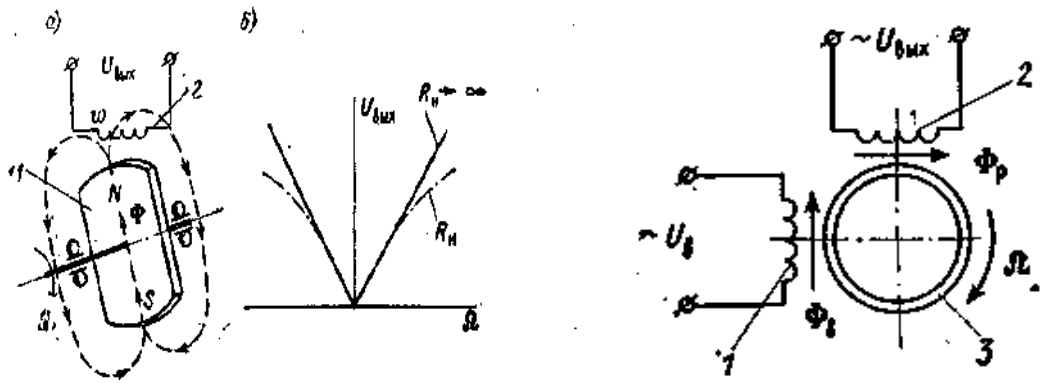
$$U = E - I R, \quad (3.6)$$

$I$  — ;  $R$  —

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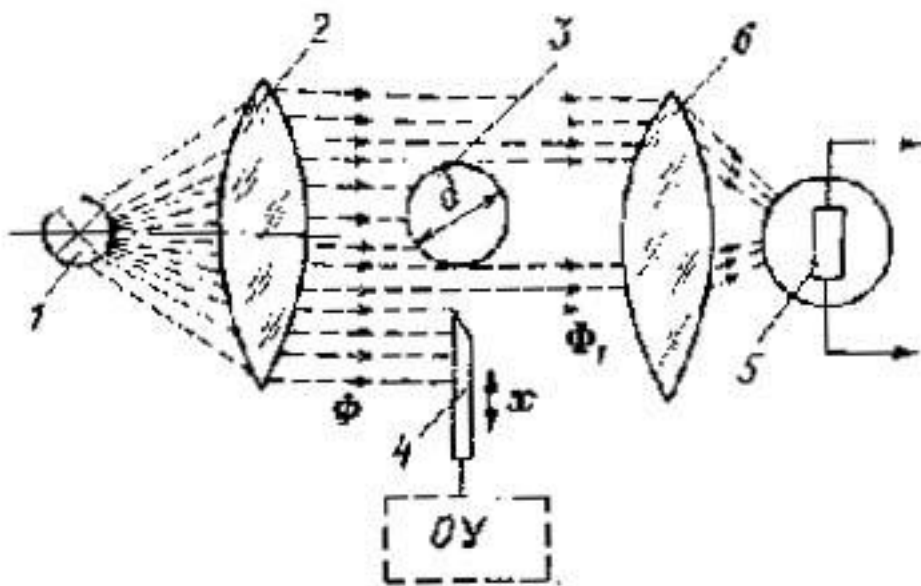
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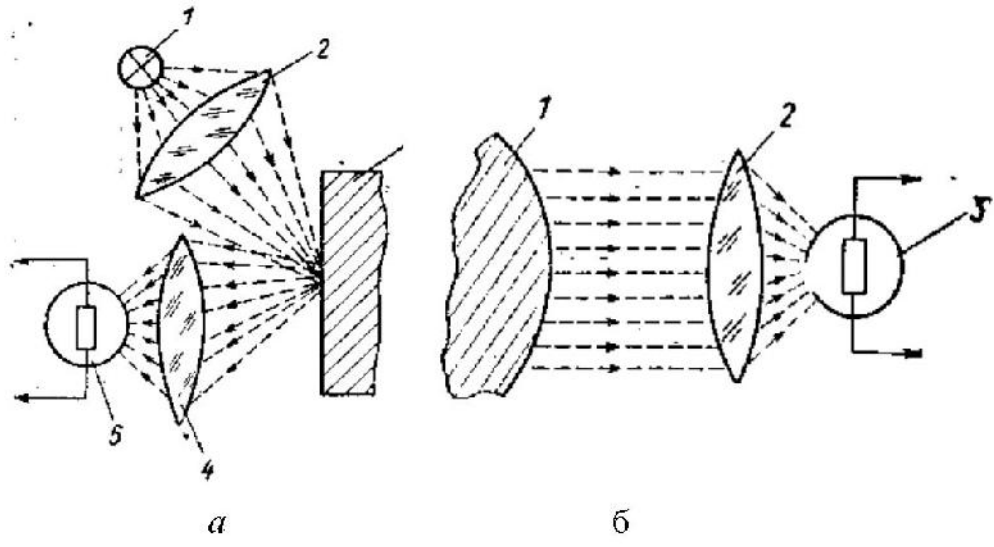
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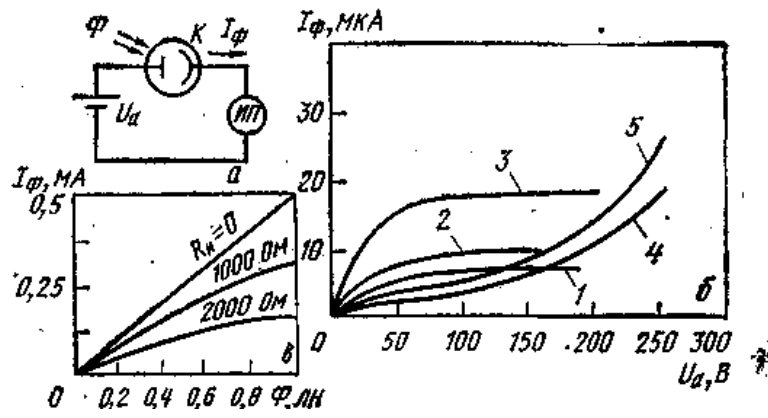
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4.1.

4.2.

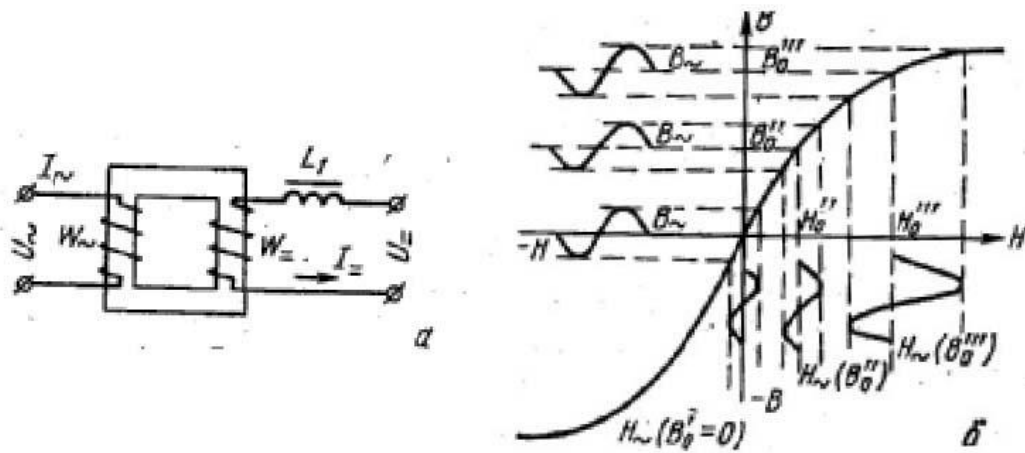
4.2.1.

( 4.1, ),

.4.1, .

$W_{\sim}$

$U_{\sim}$



4.1-

$\sim,$   
 $B_0.$   $0$   
 $H\sim$   
 $I.$   $0$   
 $I\sim$   $W\sim.$   $I\sim.$   
 $\mu$   $0$   $H_0.$   $\mu$   
 $L$  :

$$L = k_1 W^2 A \mu / l, \tag{4.1}$$

$A -$  ;  $l -$  ;  $W -$   
 ;  $k_1 -$   
 $I\sim$   $H\sim$   
 $W$   
 $L_1.$

. 4.2.  $W$   
 $1\sim$   $2\sim$

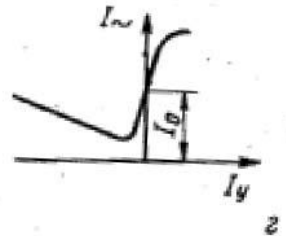
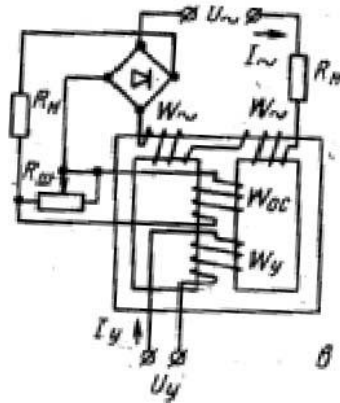
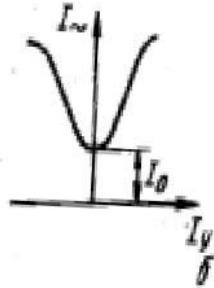
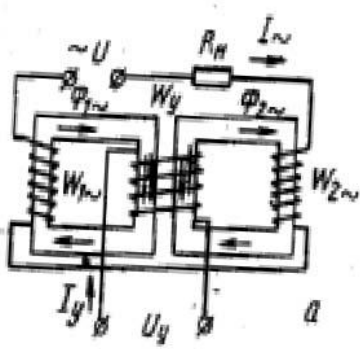
$I \sim$

$I \quad U \sim = nst$

( 4.2, ).

$I_0$  , ,

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4.2 -

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400...500 ,

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4.2.2.

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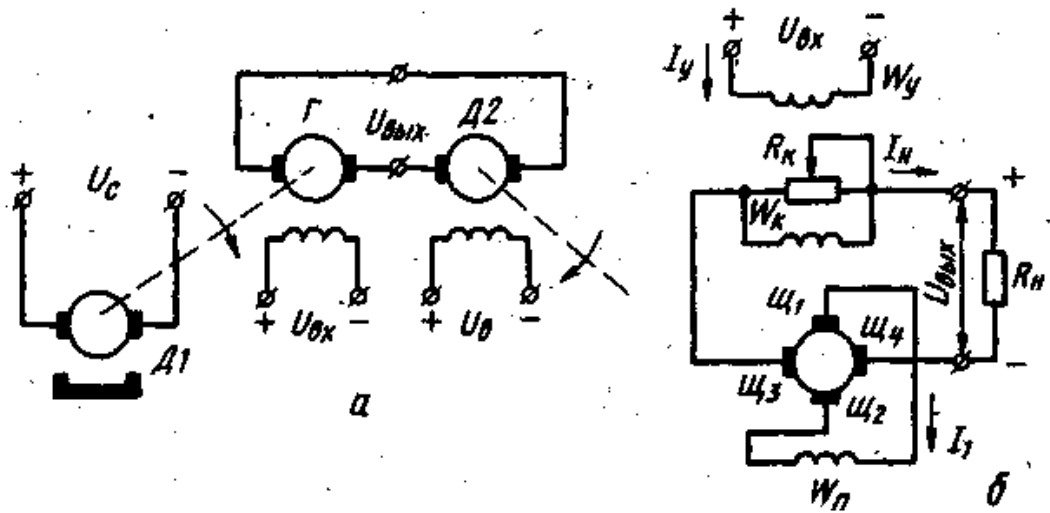
1 ( . 4.3, ).

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4.3 -

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W ,

W

$\mathbf{I}$  ,  $\mathbf{U}$  ,

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$\mathbf{I}_1$  , ,

1,

$\mathbf{E}_2$ ,

3 4

$\mathbf{R}$  .

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$\mathbf{I}$  .  $\mathbf{U} = \mathbf{E}_2 - \mathbf{I} \mathbf{R}$  ,  $\mathbf{R}_i -$

. 2, -

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$\mathbf{W}$  ,

,

2.

$(\mathbf{I} = 0) \mathbf{E}_2 \mathbf{U}$

$\mathbf{I}$  , , ,  $\mathbf{U} : \mathbf{U} = \mathbf{kU}$  (  $\mathbf{k} -$

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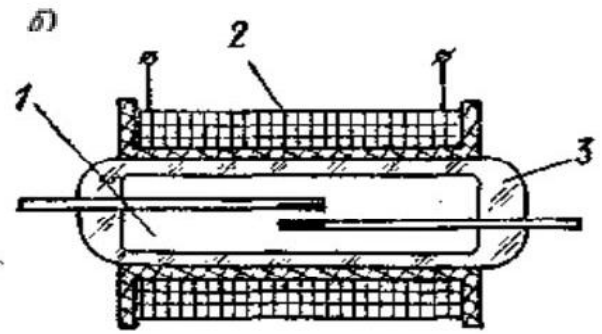
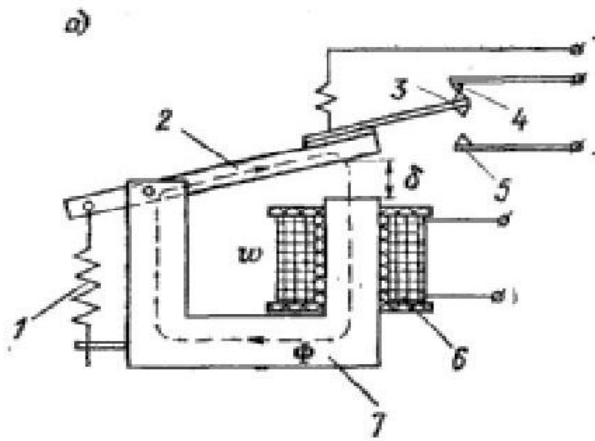
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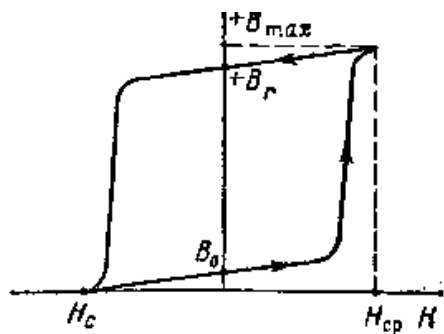
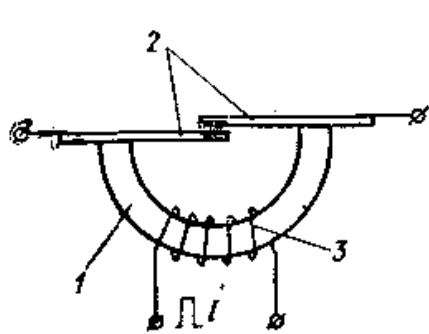
3 ( )

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4.5-

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+ m .

+ r ,

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( . 4.6).

S1 " " .

K1

( )

K1.1, 1.2, 1.3

1.

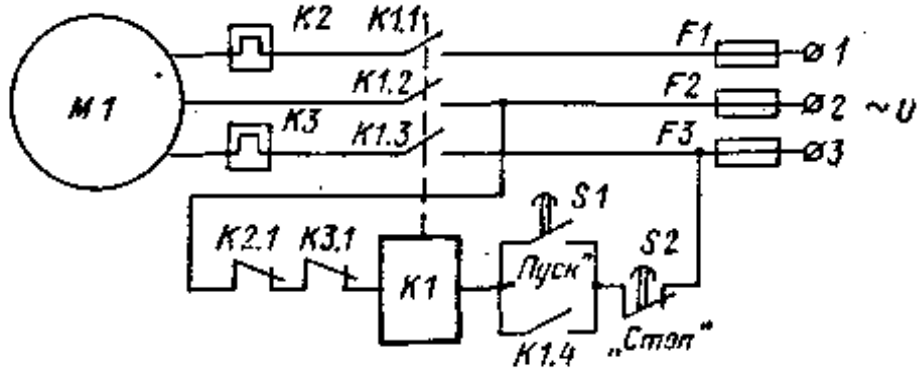
1.4,

S1.

S1

K1

1.4.



4.6 -

1- 3-

2 3.

2.1 3.1,

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1.1 ... 1.4

65 %

S1 " ",

S2 " " .

F1, F2, F3.

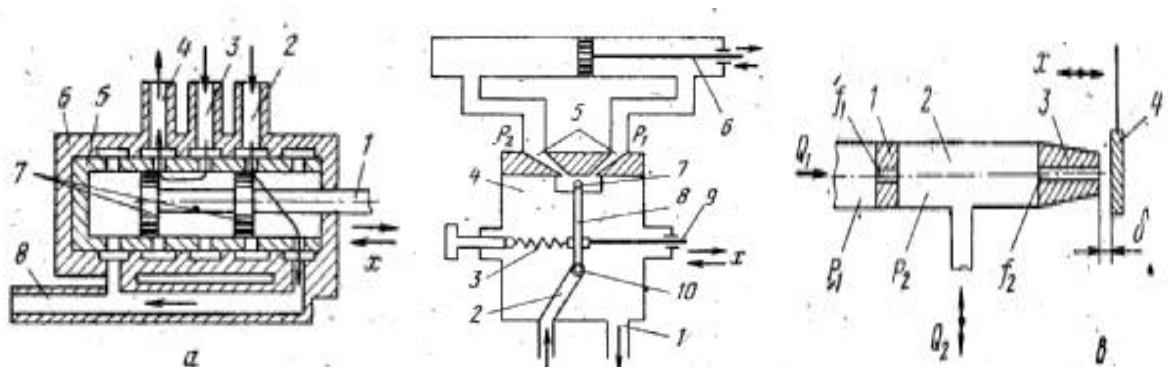
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 -  $\mathbf{I}$  ( ), ( )  
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4.3.

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 6. ( ) , ,  
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8.





4.7 -

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 10<sup>4</sup>...10<sup>5</sup>.  
 ( .4.7, ).  
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 7. 2 1 .  
 10,  
 9, ' .  
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 5. 1  
 2 .  
 6 .  
 10<sup>4</sup>.

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" - " ( .4.7, )

1  $f_1$ , 2,

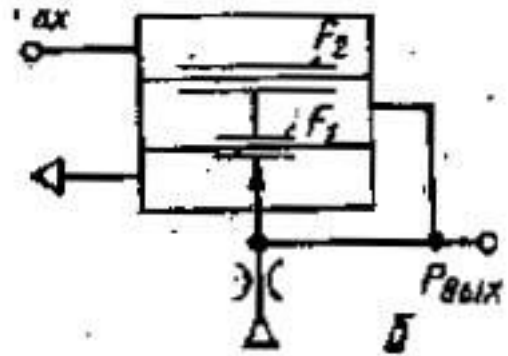
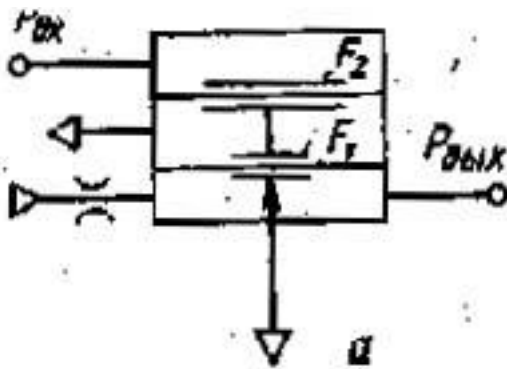
3  $f_2$  4,

1. , , ,

1, 2  $Q_2$

$$= 2Q_2.$$

( .4.8, ).

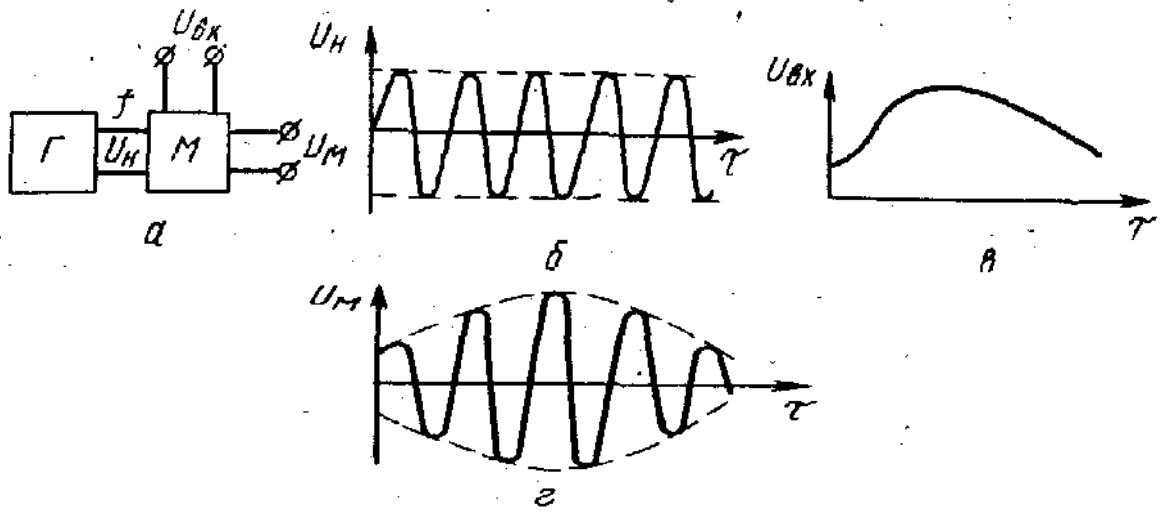


.4.8 -

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( .5.1, ).



5.1 -

5.2.

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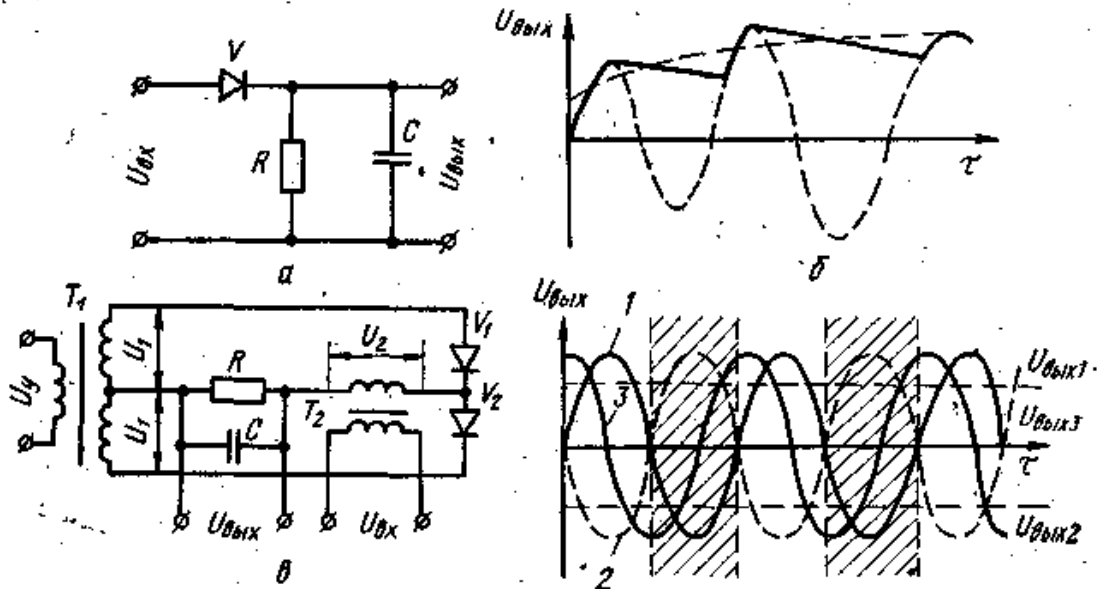
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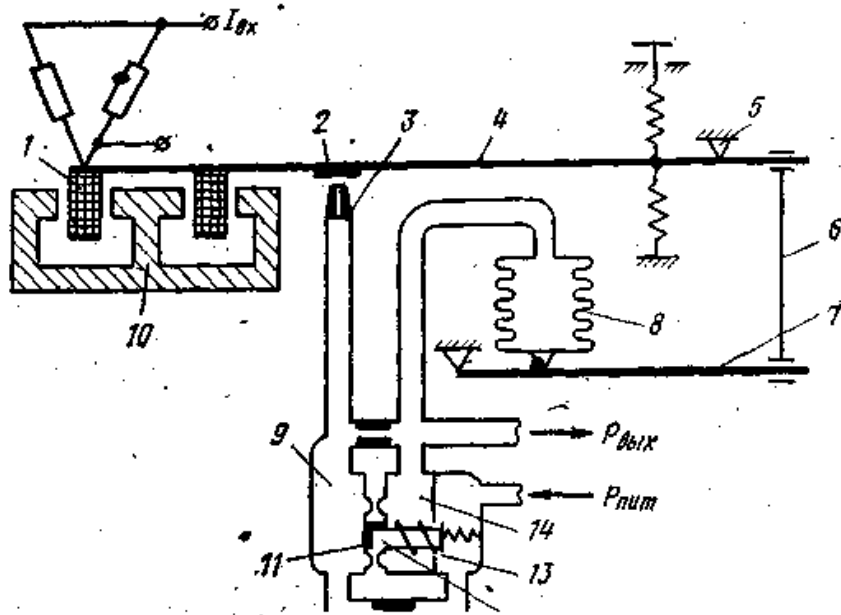
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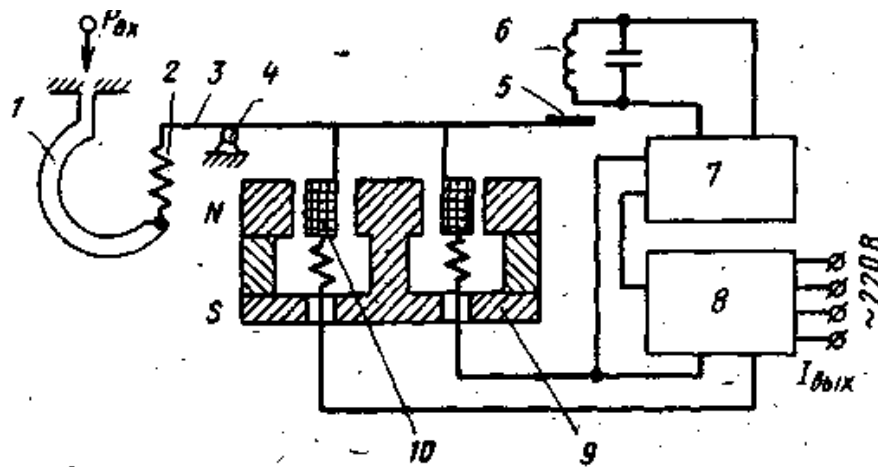
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$$I = f( \quad ).$$

5.5.

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6.1

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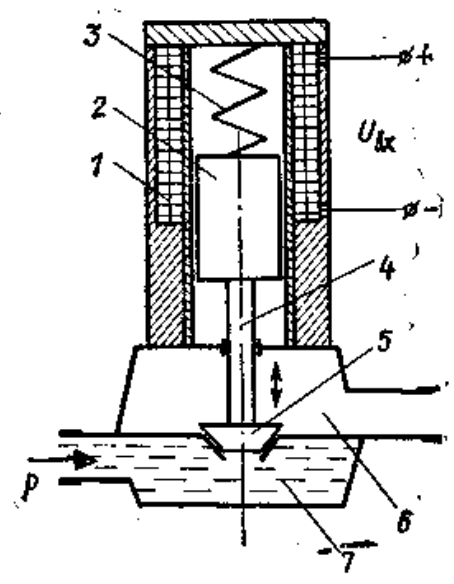
3.

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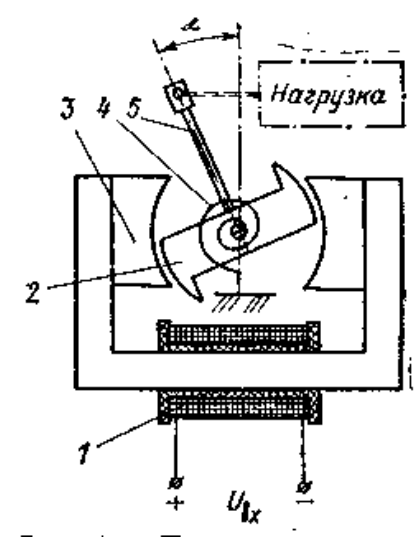
5,

6 7.

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6.1—



6.2—

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$$=f(I)$$

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6.3.

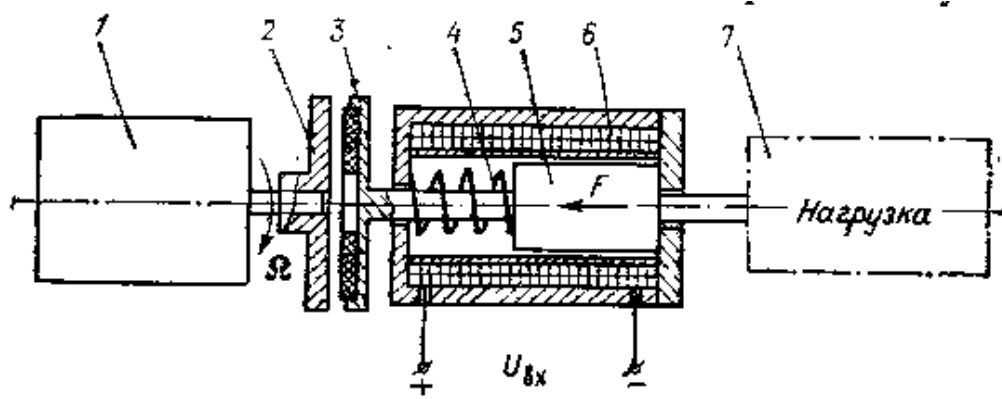
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6.3 -

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**F,**

7.

$$T = f F D,$$

**f** -

; **D** -

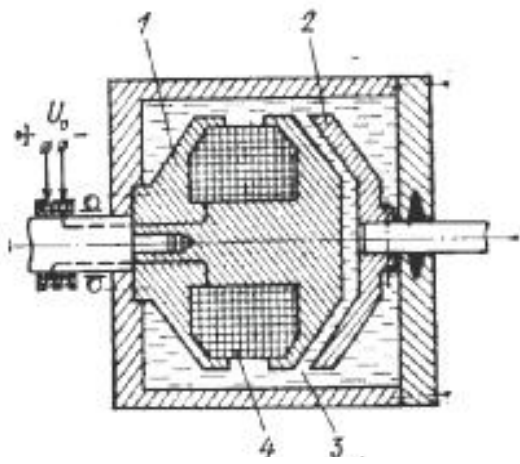
6.4

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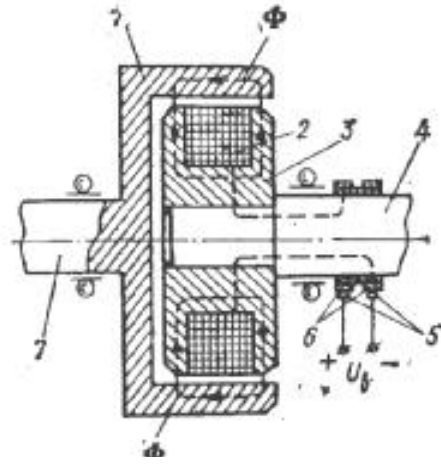
3,

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6.4 -



6.5 -

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4 , 3 2. 5 6

**U .**

1. , 2 ,

. 7. ,

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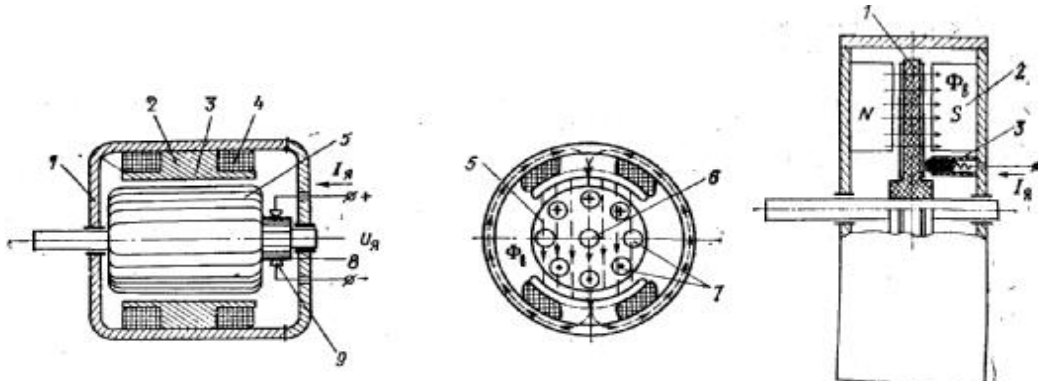
**U ,**

6.4.



6.6.

(1, 2, 3, 4) (5, 6, 7, 8, 9).  
 4, 5, 7, 8, 9.



6.6 -

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**M**

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6.4.1.

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**U** **U<sub>B</sub>** ( .

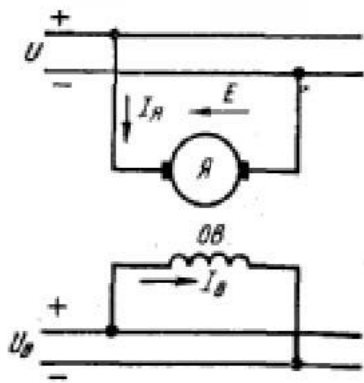
6.7).

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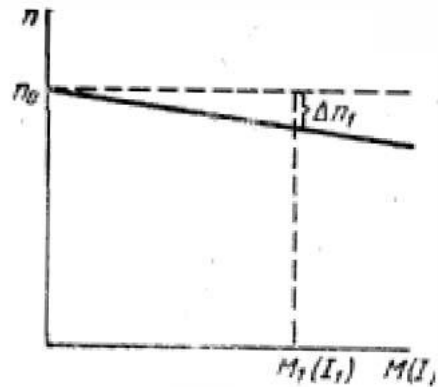
$$E N k \quad N \frac{pn}{60} \frac{N}{a} , \quad (6.1)$$

$n$  — ;  $N$  — ;  $k$  — ;  $k = N / (60 \dots)$

$$I = (U - E) / R \quad (6.2)$$



a



б

6.7 — ( ) ( )

$$N = I \quad (6.3)$$

$k = p N / (2 a) -$

$$I = M_a / (k \dots) \quad (6.4)$$

$$U = E + I R = K \dots + I R \quad (6.5)$$

( , ) ( , ) .

( 6.5):

$$n N \frac{U}{k_E W} > \frac{I R}{k W} \tag{6.6}$$

$$n N \frac{U}{k_E} > \frac{R}{k k_M W^2} N n_0 > U n \tag{6.7}$$

(6.7):

$$- \mathbf{n}_0 = \mathbf{U} / (k \dots) - \tag{6.6}$$

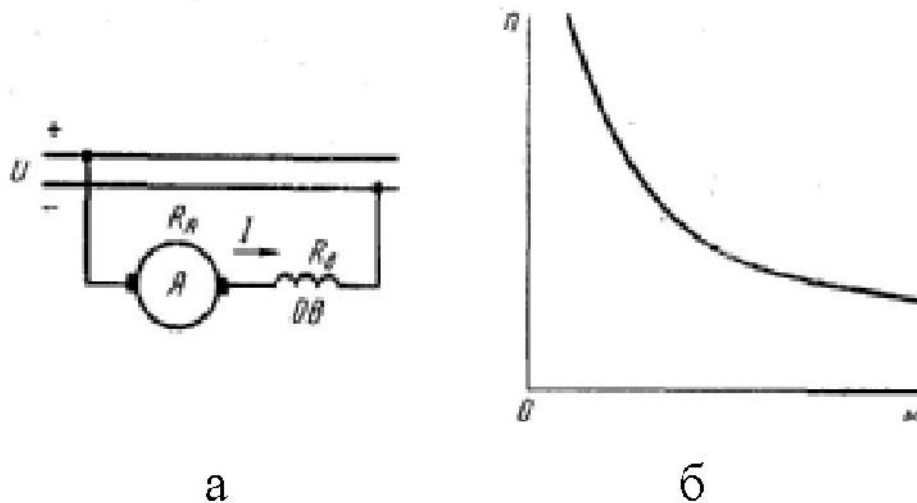
$$= 0 \quad (I = 0);$$

$$- \mathbf{n} = \mathbf{M R} / (k k \dots^2) = \mathbf{I R} / (k \dots) - \mathbf{R} . \tag{6.6}$$

(6.7) ,  $\mathbf{n} = f(\dots)$ ,  $\mathbf{n} = f(\mathbf{I})$  ( . 6.7, ).

6.4.2. :  
0 ( . 6.8, ).

$$W N \quad I \quad (6.8)$$



6.8-

( )

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$$\tilde{O} \quad I N \quad I^2 \quad (6.9)$$

$$I N \sqrt{\quad} \quad (6.10)$$

$$n N \frac{U}{k_E} > \frac{R < R}{k W} I \quad (6.11)$$

:

$$n N \frac{U}{K_E K \sqrt{\quad}} > \frac{R < R_B}{\quad} \quad (6.12)$$

(6.12)

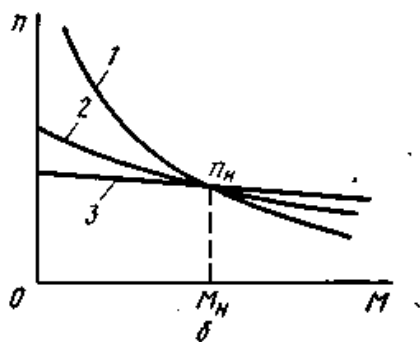
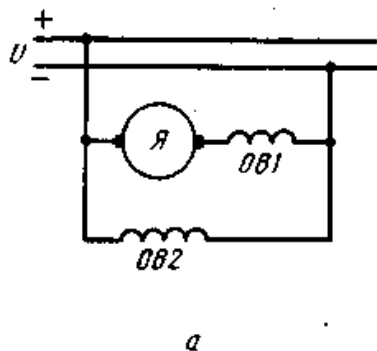
. 6.8,

( = 0      n = ).

6.4.3.

( . 6.9, ).      ( 1)

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6.9 –

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150...160%

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6.5.

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6.5.1.

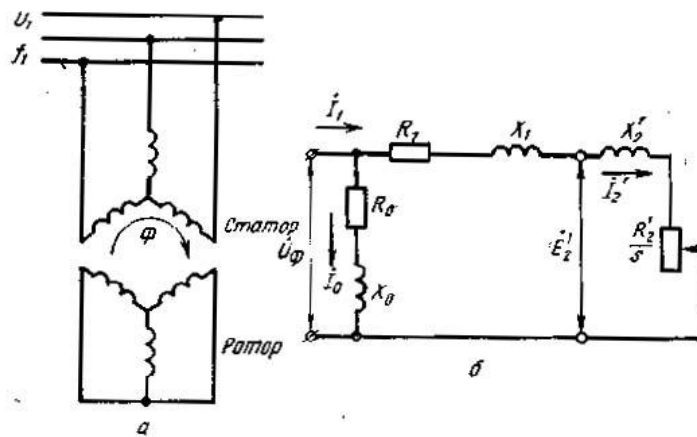
( 6.10, )

$U_1, f_1$

2 ,

$I_2,$

$$n_0 = 60 f_1 / p \quad (6.13)$$



6.10 -

( )

( )

$$p = 2 f_1 / n_0, \quad (6.14)$$

S :

$$S = (n_0 - n) / n_0 = ( \dots ) / \dots \quad (6.15)$$

$$= f(S) \quad [6].$$

R<sub>1</sub>

1+ 2

S ,

( )

d / dS

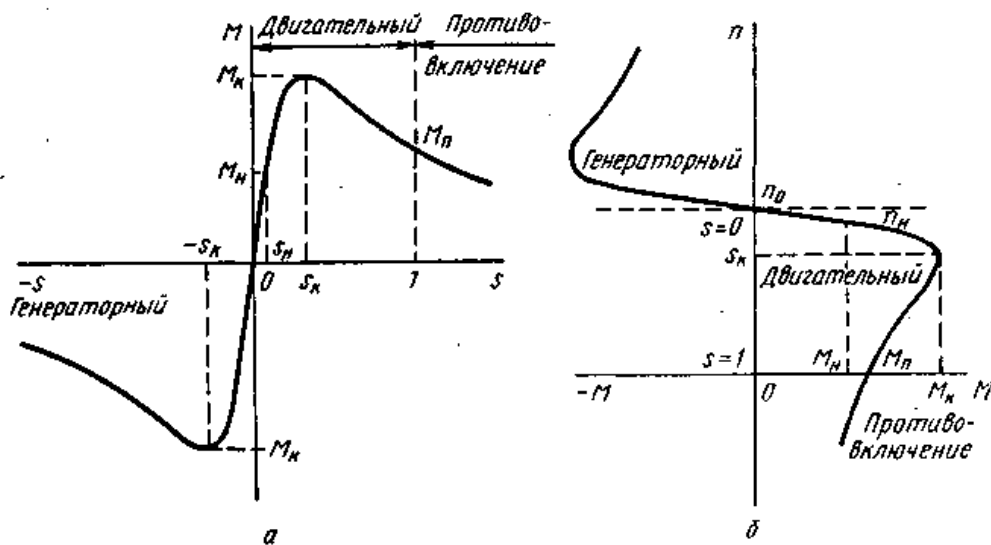
$$S = \pm R_2 / (X_1 + X_2), \quad (6.16)$$

R<sub>2</sub> X<sub>2</sub> -

; X<sub>1</sub>-

$$(6.16)$$

[6],



6.11 -

$$= f(S); \quad -n = f( )$$

$$= \pm 3U^2 / [2 \cdot 0 (\mathbf{X}_1 + \mathbf{X}_2)] \quad (6.17)$$

"+" (6.16)

(6.17)

"\_"

:

$$= 2 \quad / [S/S + S/S] \quad (6.18)$$

. 6.11.

$$\mathbf{S} = \mathbf{S} \quad \mathbf{S} = +$$

:

$$\mathbf{n}_0 \quad ( \quad = 0, \mathbf{S} = 0 )$$

–

$$\mathbf{n} \quad ( \quad = \quad , \mathbf{S} = \mathbf{S} ).$$

**S**

–

$$( \quad ) \quad ( \quad \mathbf{S} = \mathbf{S} , \quad = \quad )$$

–

$$( \quad \mathbf{S} = \mathbf{1}, \quad = \quad )$$

S , S/S S /S ,

:

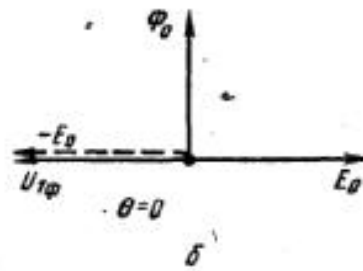
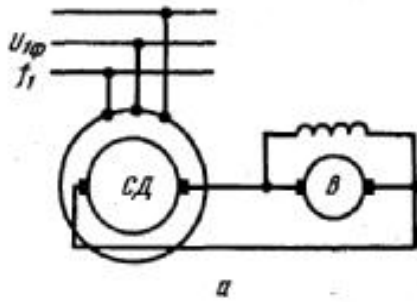
$$M=2 M S / S \quad (6.19)$$

6.5.2.

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6.12 – ( )

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**m 3,**

( 2 3 )

. 6.13

**m= 6.**

1-2-3-4-5-6,

7

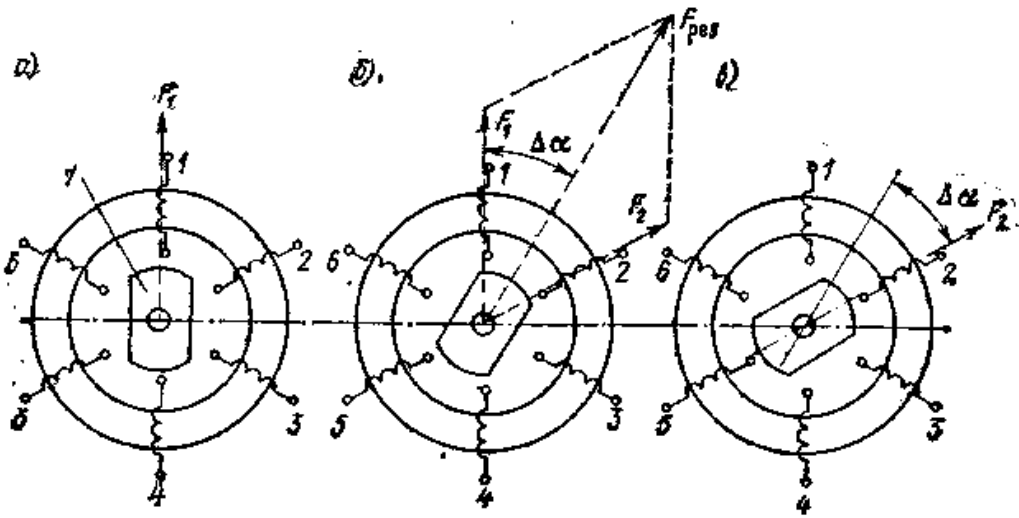
,

1-2-3-4-5-6.

**F**

$$= 360^\circ / m = 360^\circ / 6 =$$

$= 60^\circ$ .



6.13 -

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1,5° 36°

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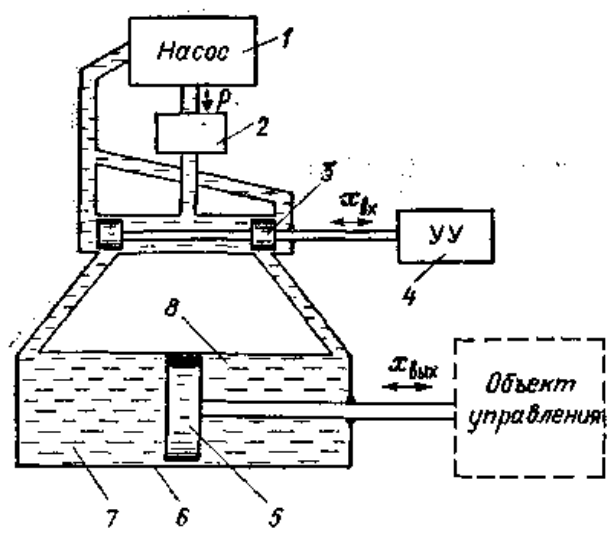
6.7.



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 ( , , , ).

6.14

1 . 2.  
 3 4.  
 5 .  
 ( )



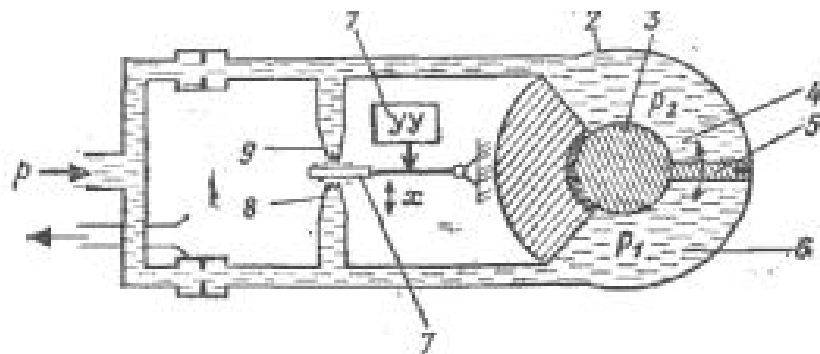
6.14 –

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( " ").

. 6.15



6.15 -

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4 6.

7

8 9,

4 6

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360°.

. 6.16

2 5,

3.

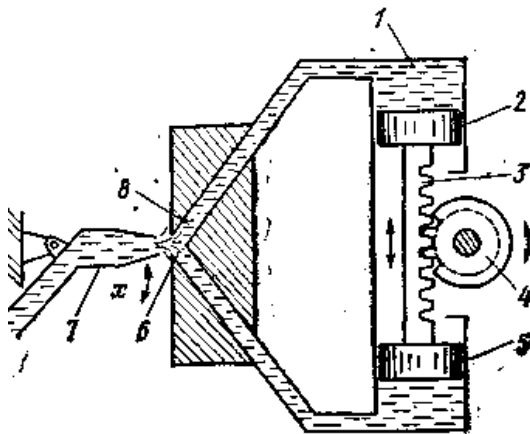
4,

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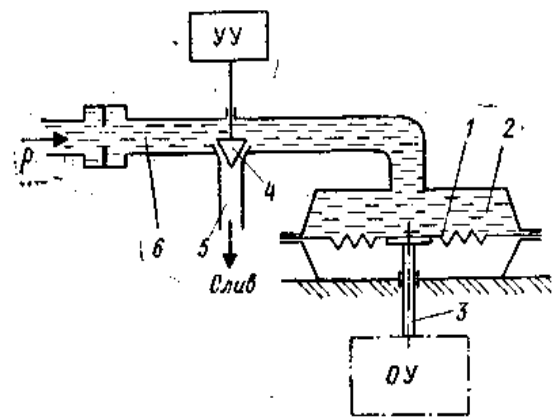
6 8,

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6.16 –



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360°,

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7.2.

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$$= (n_0 - n), \quad (7.1)$$

$$\left( = k \quad k^2 / R \right)$$

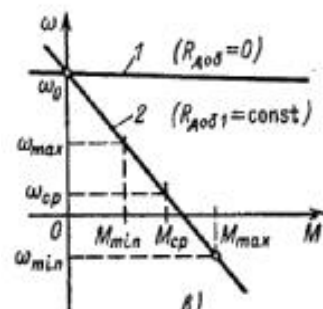
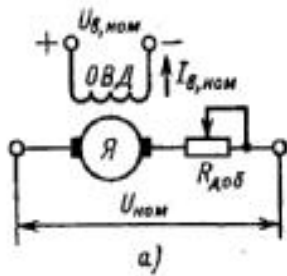
**R**

. 7.1, . 7.1,

=f( )

( 1)

2,



7.1 –

( )

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2 -

m =

= m - min.

( , )

m = 1 min = 2 .

**R**

**I<sub>1</sub>=**

= nst I<sub>2</sub> = nst ( . 7.2, ). . 7.2

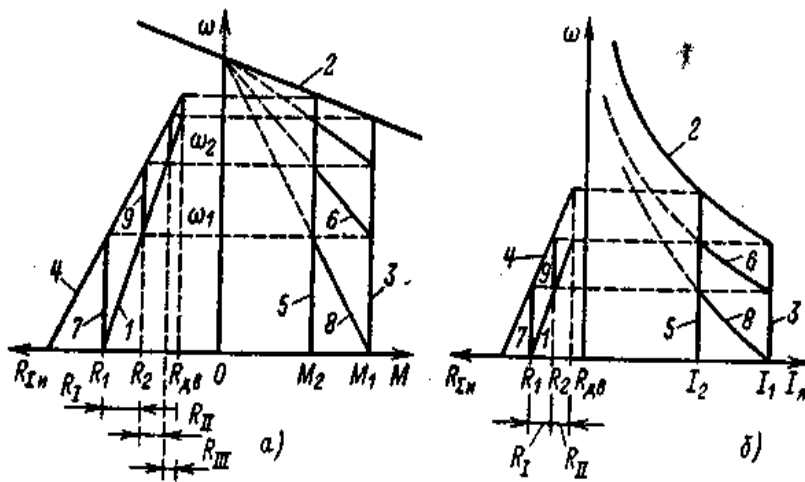
**R,**

**R = R<sub>1</sub> = const**

2 < < M<sub>1</sub>

0 1( 7 8).

**R**



7.2-3

**R<sub>H</sub> = f( )**

7.3.

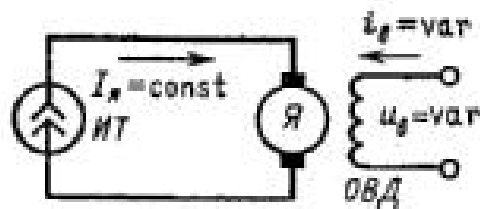
. 7.3.

$$U_B = v$$

( - )

$$I = \text{nst},$$

$$I = v$$



7.3 -

$$= kI \quad = k$$

$$= \text{nst}$$



7.4.

**R**

( . 7.4, )

**R**

**U.**

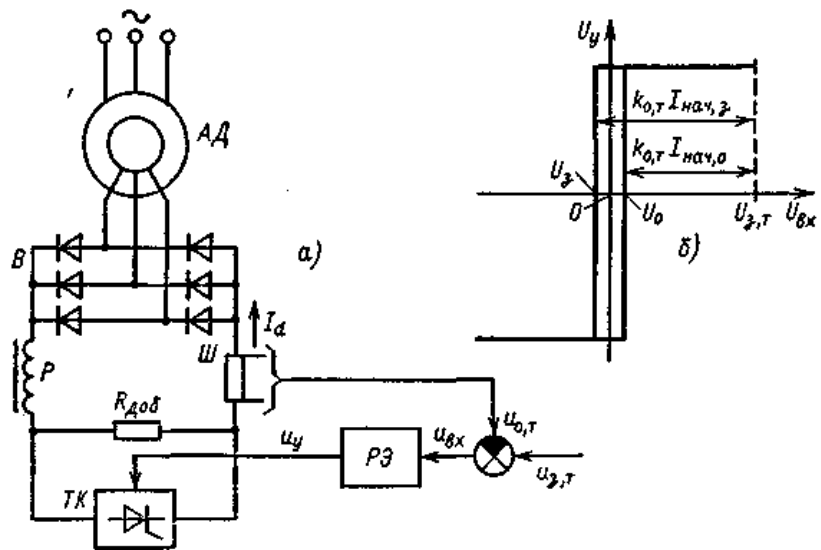
**U..**

. 7.4, :

$$U = U_0,$$

$$U = U_0.$$

$$I \dots, I \dots$$



7.4 -

( )

( )

7.5.

$$U = nst = nst$$

$f_1$

$U_1$

$I_1$

– [7, 5.9]

7.5

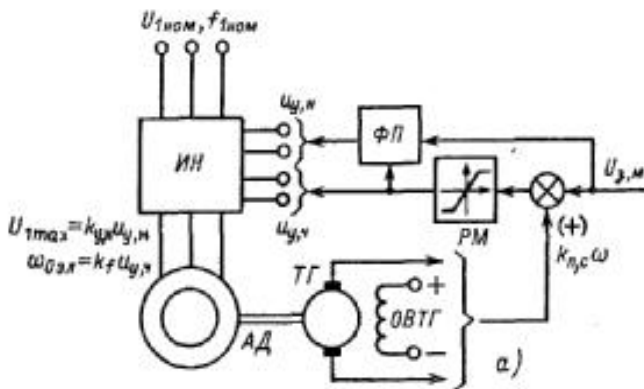
=k

=const.

$S_a$ .

= -k

I .



7.5 –

S ,

8.

8.1.

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(

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:

— , **k** ,

**n<sub>m</sub>** , **n<sub>min</sub>(k = n<sub>m</sub> / n<sub>min</sub>).**

1:1, 2:1, 25:1 . .

$k = (100...500):1$  ;

— ,  
.  
k  
k =  $n_{i+1} / n_i$ .  
k , ;  
— ,  
— ;  
— .  
— , — .  
— , ;  
— .  
— ;  
— , .

8.2.

(6.7)

U,

I , n<sub>0</sub> n.

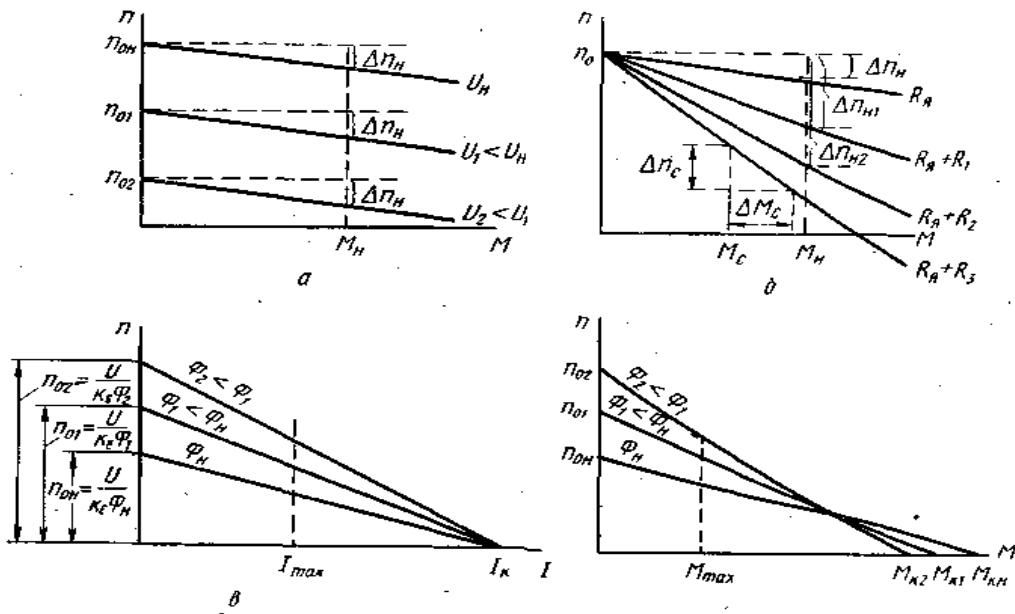
U,

n<sub>0</sub>.

U

( . 8.1, ).

$n=f(R +R),$



8.1 -

( . 8.1, ).

$$\left( \begin{array}{c} \mathbf{n}_0 = \mathbf{U}/(\mathbf{k} \quad ) \end{array} \right)$$

( ) , ,  $\mathbf{n} = f( )$   
 . 8.1, . 8.1,  $\mathbf{n} = f( )$ ,

8.3.

$$\mathbf{n} = f( )$$

. 8.2, ...

( . 8.2, ),

$\mathbf{V}$  . , . 8.2, .

. 8.2,

1,

$\mathbf{V}$  , ,

$\mathbf{V}$  , ,

$\mathbf{U}$

2,

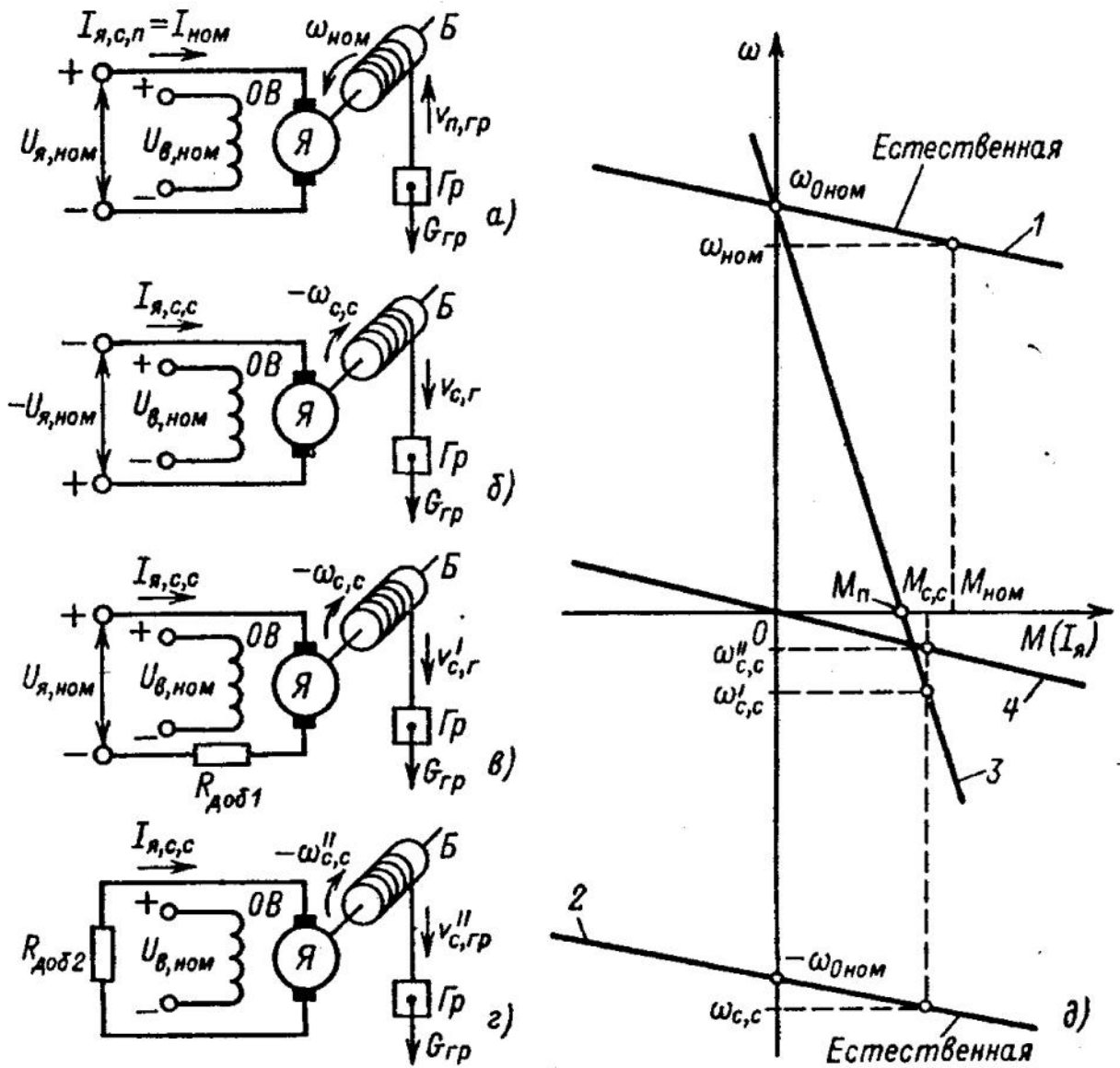
. 8.2,

(

).

. 8.2, .

. 8.2, ,



8.2 -



**R**<sub>1</sub>,

(

) ,

..

. 8.2, ,

(

3)

.. ,

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. 8.2, .

**R**<sub>2</sub>

“ ..

4 . 8.2, .

8.4.

8.4.1.

.

.8.2,

. 8.1,

,

,

.

.

**I** ,

,

:

$$=k \quad \mathbf{I} = \quad . \quad (8.1)$$

8.4.2.

**U**

**I** ,

, 2:1 3:1, 5:1 ( , ) .

, . ( . 8.1, , )

,  
,

8.4.3.

. 8.1, .

,

.

,

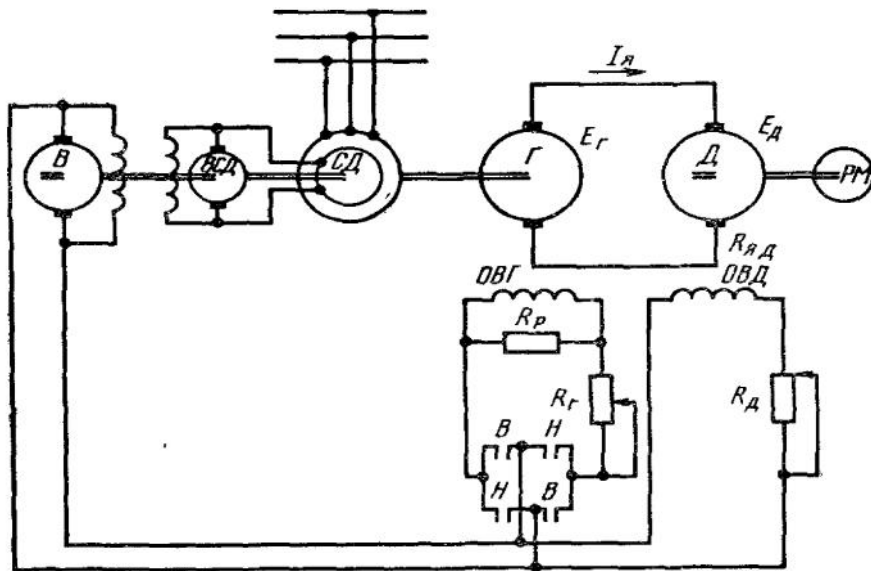
- ( - ).

( - ) .

8.4.4.

-

8.3.



8.3 -

**R .**

**R .**

**(R = 0 R = 0)**

).

-

.

**I R**

(8...10): 1.

(

**R .**

)

(2...3): 1.

8.4.5.

)

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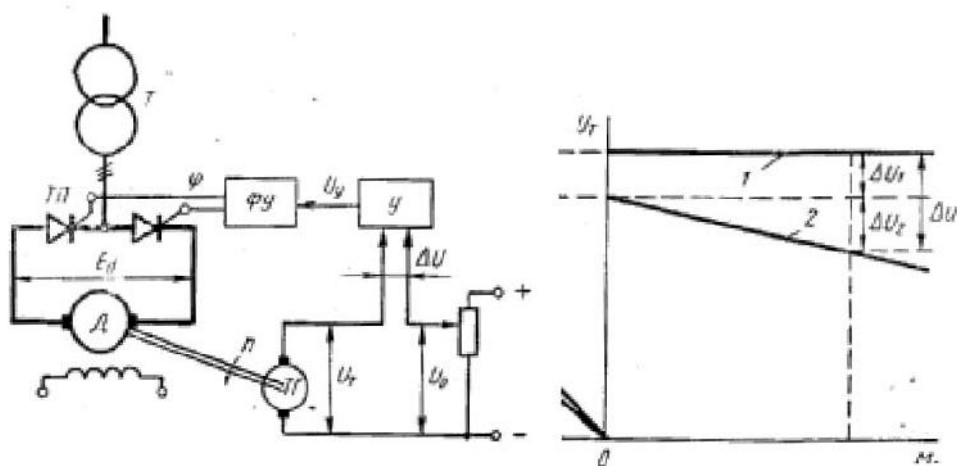
,

.

( 8.4, )

$U_0,$

$$U = k n .$$



8.4 – ( ) ( )  
: 1 – , 2 –

$$U , \quad U = U_0 - U$$

$k .$

$$U = k U$$

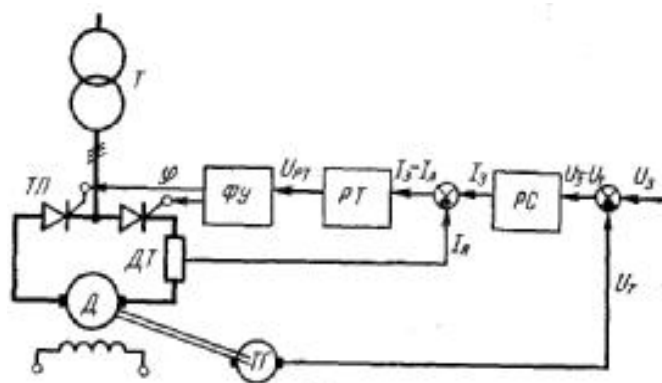
d.

$$U \quad E_d,$$

8.4.6.

8.5.

U,  
I,  
U U



8.5 -



8.5.

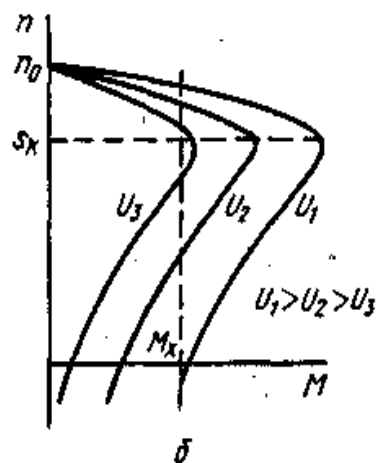
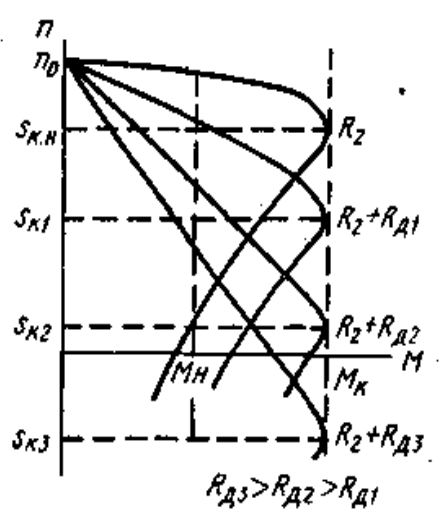
( ),

$R_1$

(6.16), (6.17) (6.13)

$S_1$ ,

( 8.6, ).



8.6 -

U , ,

1,

( . 8.6, ). ,

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. 6.

8.5.1.

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8:1.

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8.5.2.

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**R**

S 1,

( .

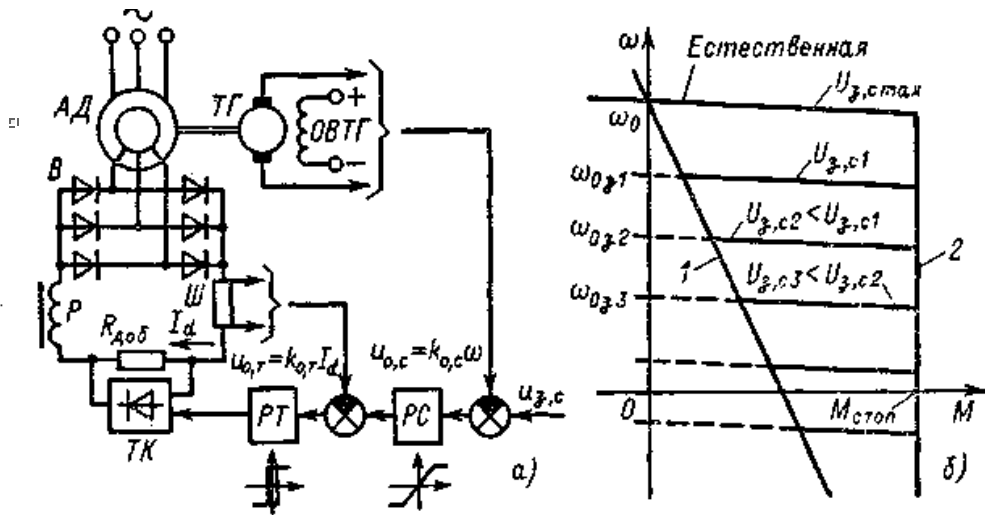
8.6, ).

( . . 8.3),

. 8.8, .

U . ,

8.7, . ,



8.7 -

1

( R ),

2,

( . 8.7, ).

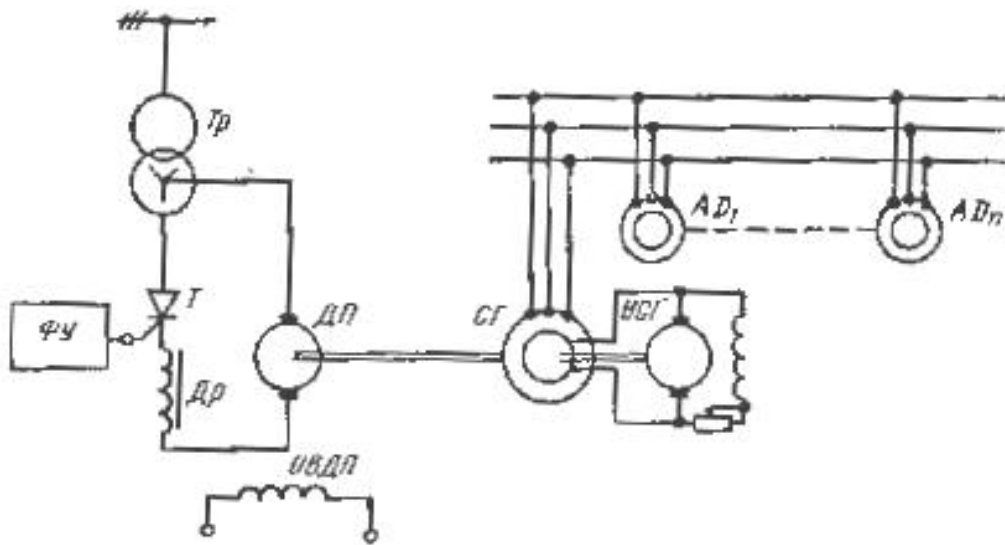
U .

8.5.3.

$$n_0 = 60f_1 /$$

$f_1$

. 8.8.



8.8 -

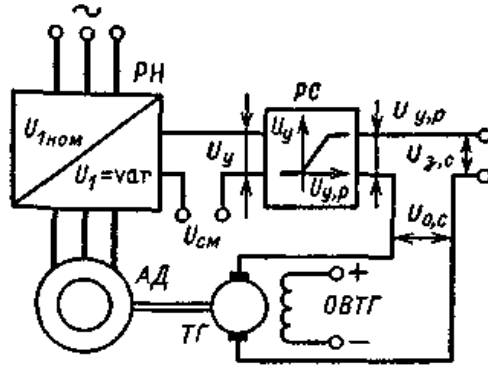
$D_1, \dots, D_n$

$$f_1 = 4,44 k_1 f_1 U \quad (8.2)$$

$U = \text{const.}$

.7

. 8.9.



8.9 –

U

U.

U<sub>0.</sub>,

U ,

U = 0

( - )

S.

[7].

9.

9.1.

.  
 :  
 — (      );  
 — ;  
 — (      );  
 — (      ,      ).

9.2.

.  
 (      ).  
 ,  
 ,  
 .  
 ,  
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 .  
 ,  
 :  
 — ,  
 $t$  .  
 $t$   
 ,



$$= t.$$

;

-

$$,$$

$$^2 / 2 = ( + ) , \quad (9.1)$$

-

; -

$$= + = t + ^2 / [2 ( + )] \quad (9.2)$$

$$,$$

$$(9.2)$$

,

,

$$,$$

$$(9.2).$$

,

,

,

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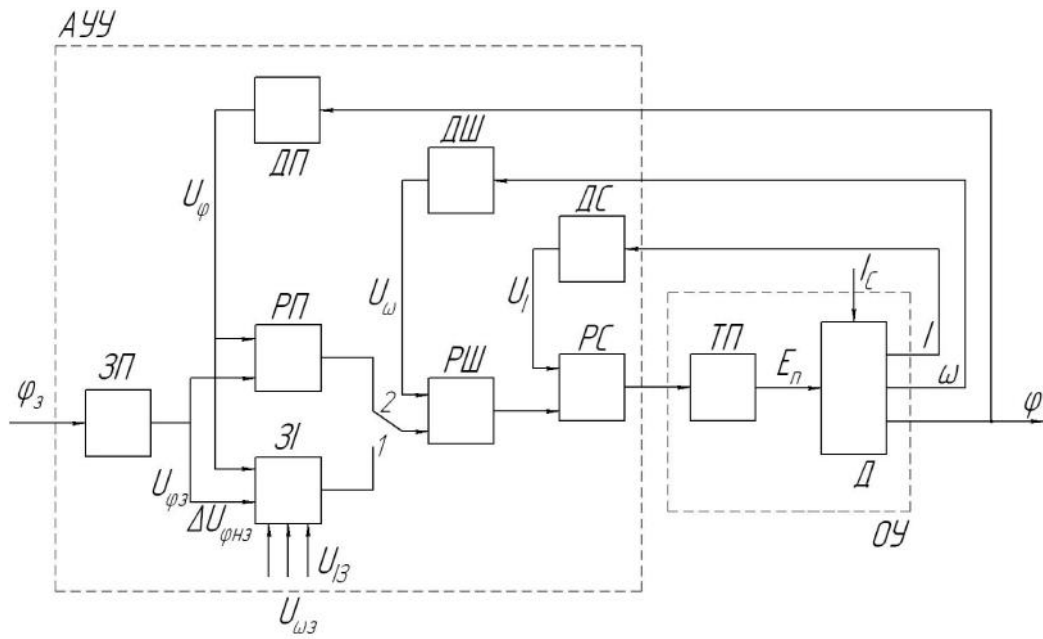
,

-

$$D = \quad /$$

9.3.

.9.1.



9.1-

, .  
 , , .  
 , , , .  
 ( ) .  
 ( )  $U$  . ( , )  
 ( , )  $U$  .  $I$   
 $U_L$  ,  
 , —  
 .  
 3  $U$  ,  
 - .  
 $U = U - U$   $U_I$   
 $U$  ,  $U_I =$   
 $= U - U$   $U$  ,  
 ,  
 $I_c$  .  
 , , , .  
 , , , .  
 .  $U_3$  ,

3.

$$U_3 \quad t \quad U = U_3 - U .$$

. 9.2.  $t_3 \quad t_0 -$

, , U  
 U . U . , U\_3, U\_3  
 ( ) .

U\_3, U .

1, U > U . 2-

U U ..  $t = 0$

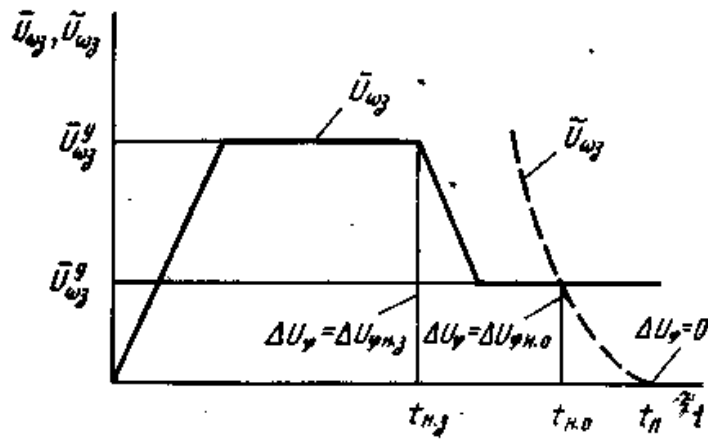
= 3 1.

U\_3

t . ,

t .

2.



9.2 -

U<sub>3</sub>

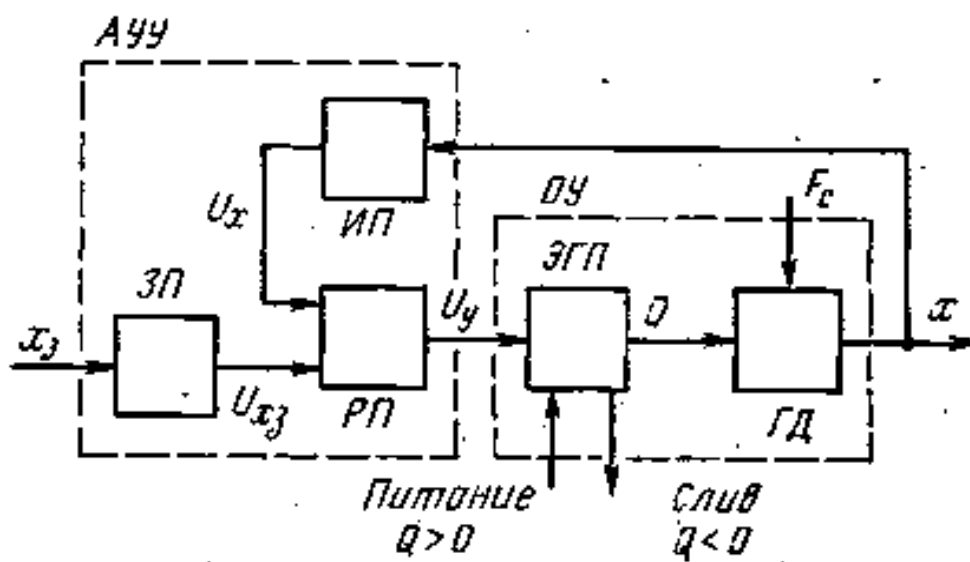
t.

1

2

9.4.

9.3.



9.3 -

U .

3

$U_{x3}$  .

$$U_x = U - U$$

U

Q

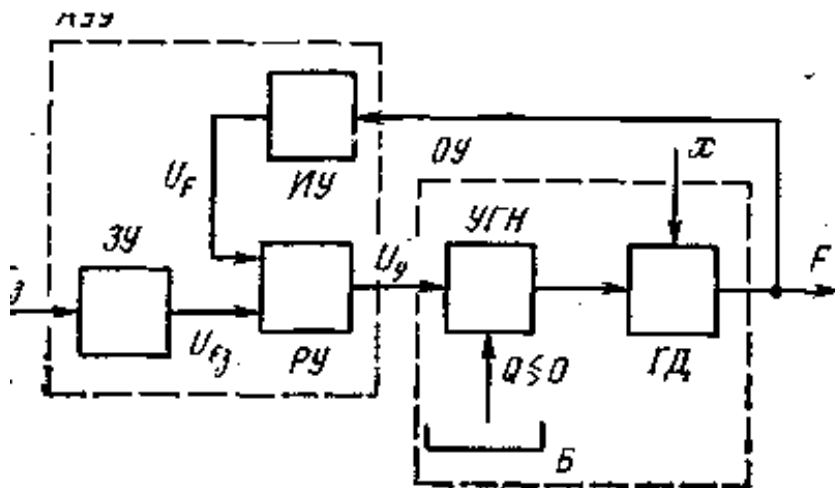
(Q > 0)

(Q < 0)

Fc.

9.5.

9.4.



9.4-

$U_F$   $U_F$

$\mathbf{F}$

$\mathbf{F}_3$

$U$

$\mathbf{Q}$

10.

10.1.

( ).

$$= ( \quad / \quad )100\%.$$

0,025; 0,04; 0,05; 0,06; 0,1; 0,2; 0,25; 0,4; 0,5; 0,6; 1,0; 1,5; 1,6; 2,0; 2,5; 4,0.  
0,5; 1,0; 1,5.



10.2.

[7]

:

, 273,16 .

( ),

( ).

-259,34

( ) 1064,43° ( ).

*t*,

° .

**t**

$$= t + 273,15.$$

10.2.1.

( )

( )

( )

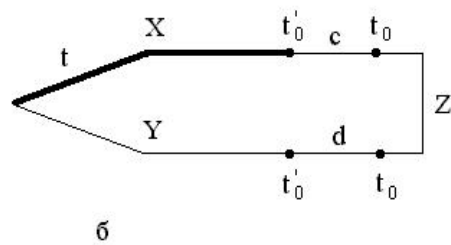
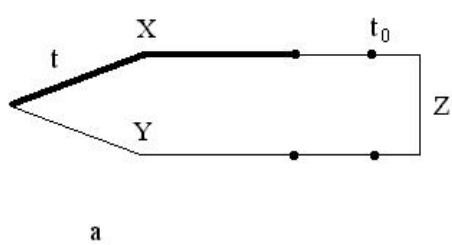
-190 +600° .

-50 +630° .

( )

( )

10.1.



10.1 -

:

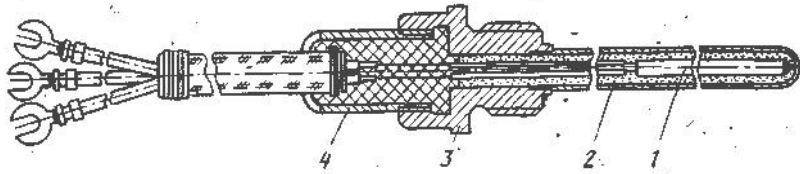
Z; -

d.

+2500 ° .

10.2.

1



10.2 –

: 1 –

; 2 –

(

); 3 –

; 4 –

9...30c

( )

-200 +650°

( )

-50 +180° .

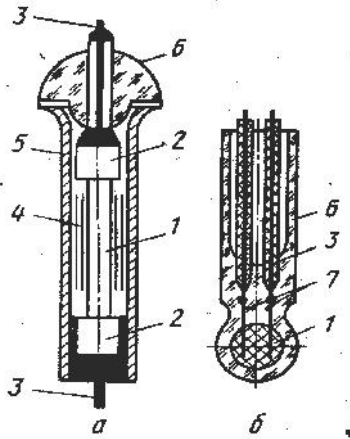
( )

-90 +180° .

( . 10.3).

10.4.

( ) - ( ).



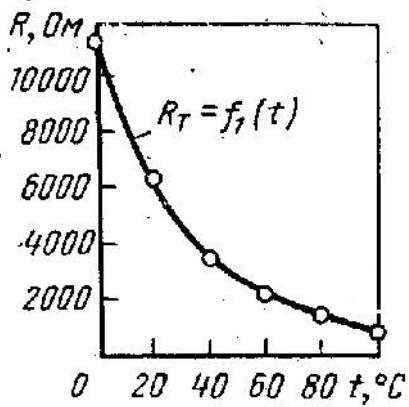
10.3 -

; - ; 1-  
; 2- ; 3- ; 4-  
; 5- ;  
6- ; 7-

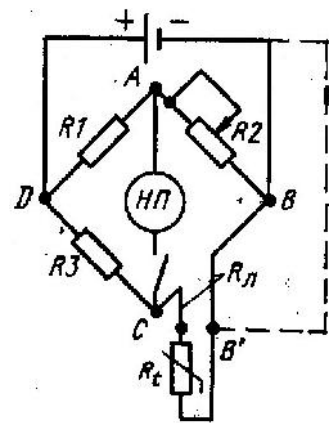
10.5.

R1 R ,

R2



10.4 -



10.5 -

Rt.

2R

Rt.

DB

R2

( .10.5 )

Rt.

10.2.2.

:

( )

[7]:

( ):

+ .

1%

;

-

1

2.

" -1-3"  
 1400...2800° , " -4" 1200 1700 ° , " -6" 900  
 +2200 ° . 1400...2800 °  
 ±0,6%

;  
 - 0

10.3.

,  
 ( ) ,

10.3.1.

,  
 ,

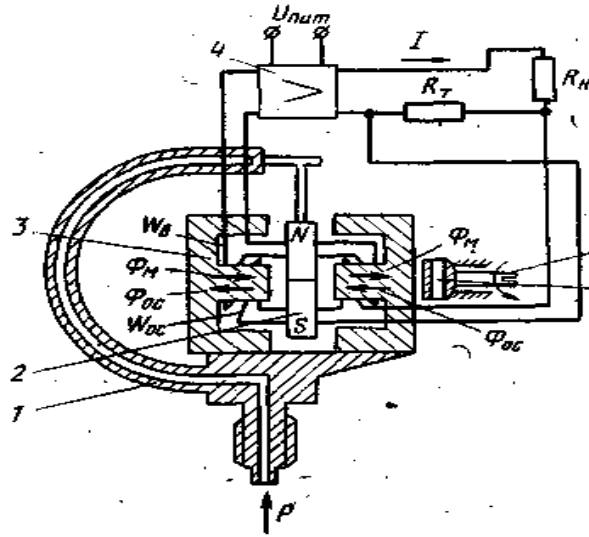
0.5

( )

. 10.6.

1 2,  
 ,

W



10.6 -

3,

W

4.

I

R,

6

5.

5%

100%-

1 .

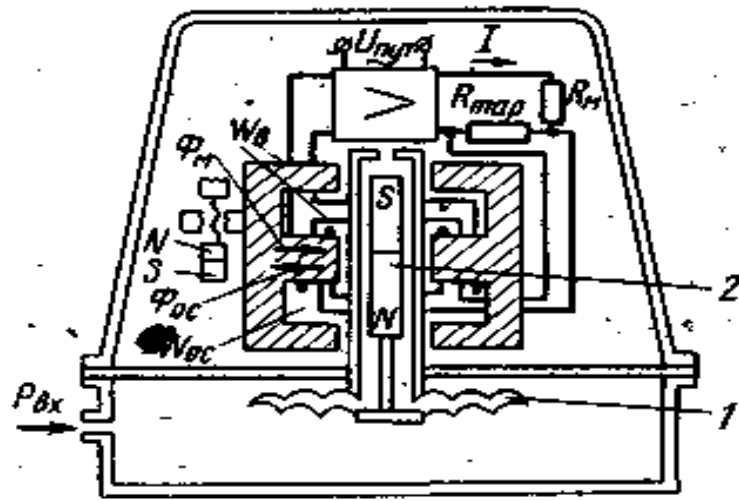
1,0...2,5%.

10.3.2.

( . 10.7)

0.5

1,



10.7 -

2,

( . . 10.6).

0,16; 0,25; 0,6;

1,6 2,5 .

±1 %,

1 .

901...909

10.3.3.



$$\mathbf{R} = \mathbf{kR} , \quad \mathbf{R} - \mathbf{R} ;$$

-  
100  
0,2%.

( 3·10<sup>3</sup> ),

1 %

[7].

10.4.

10.4.1. ( . 10.8)

**h .**

**h** ,

**-h** ,

100 ( . 10.9).

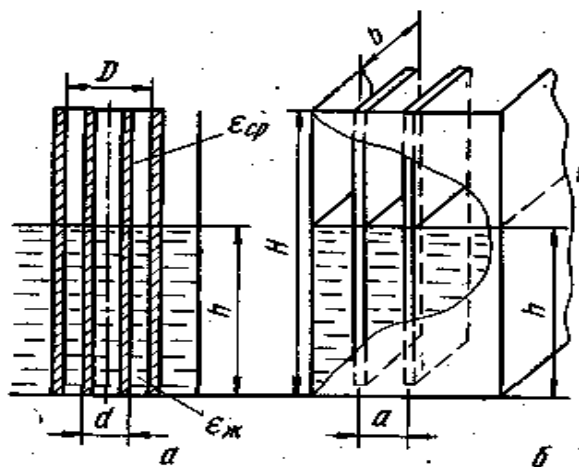
**R<sub>1</sub>,**

( )

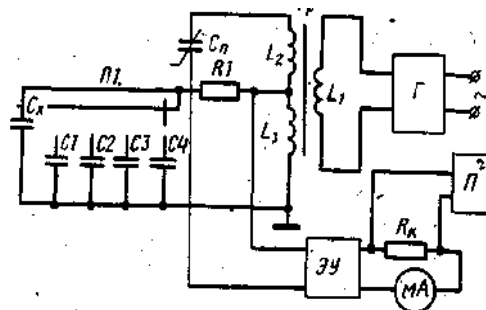
**R**

0...100 .

1.



10.8 -



10.9 -

-2

10.4.2.

[7]

( )

10.4.3.

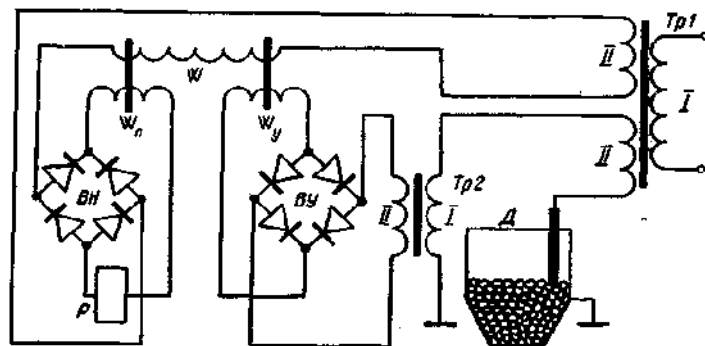
[2,7]

1...3

-1, -2, -1, -1

-1

10.10.



10.10 –

1.

( W )

W,

W ,

( . 10.11, ) ,

1 2

( . 3.11, )

1

2,

3.

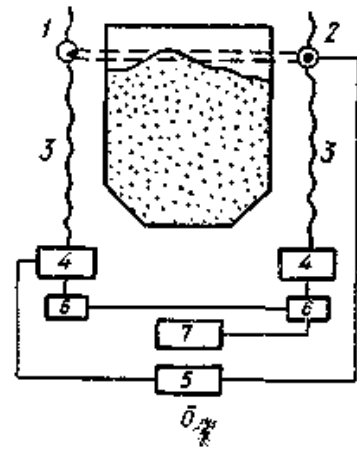
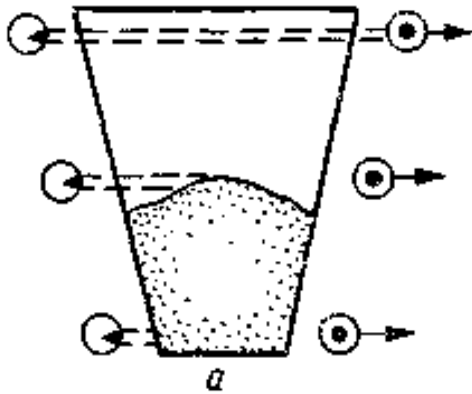
4

6,

"

" ,

5



10.11-

( )

( )

7.

( . 10.12)

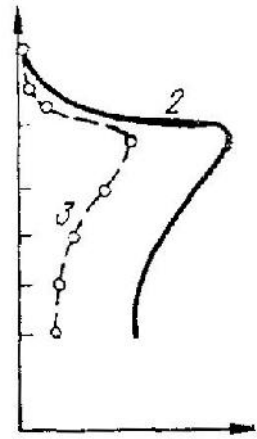
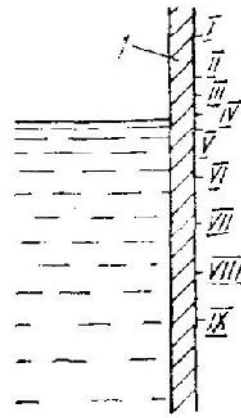
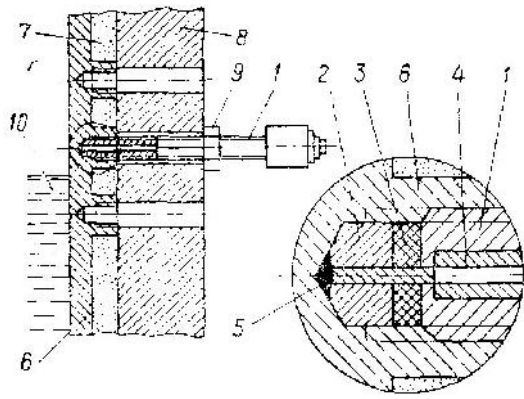
[2]

80 20%

( ).

( - )

. 10.13.



10.12 -

; 1 -  
 ; 3 -  
 ; 5 -  
 ; 7 -  
 ; 9 -  
 ; 10 -

10.13 -

; 2 -  
 ; 4 -  
 ; 6 -  
 ; 8 -

: 1...1  
 ; 2

10.5.

**G**

**Q**

[7].

3/ ,

3/ / .

10.5.1.

[7]

( )

( )

( )

$$A_1 v_1 = A_0 v_0 = A_2 v_2,$$

1 2 -

; 0-

; v1, v0, v2-

$$Q = 0.2(1 - 2) / , - ; -$$

10.5.2.

( ),

[7].

0,025...63<sup>3/</sup>

( ) ± 2,5%.

10.5.3. ( )

[7].

10<sup>-5</sup> -1 -1.

10.5.4.

10.5.5.

[7]

**V : n = k V .**

**Q = AV ( A - ), :**

**n = kQ/A,**

**k -**

( 0,015<sup>3/</sup> ),

( 2500<sup>3/</sup> ).

0,2...0,5%.



2.5%.

( 60 )

6...60<sup>3/</sup> ,

0,5%.

10.5.6.

( )

10.6.

( ),

10.6.1.

[4].

10.6.2.

( - ) .

. 10.14, .

1 2

2 /4

1 2

1 2,

**n t**

2

1.

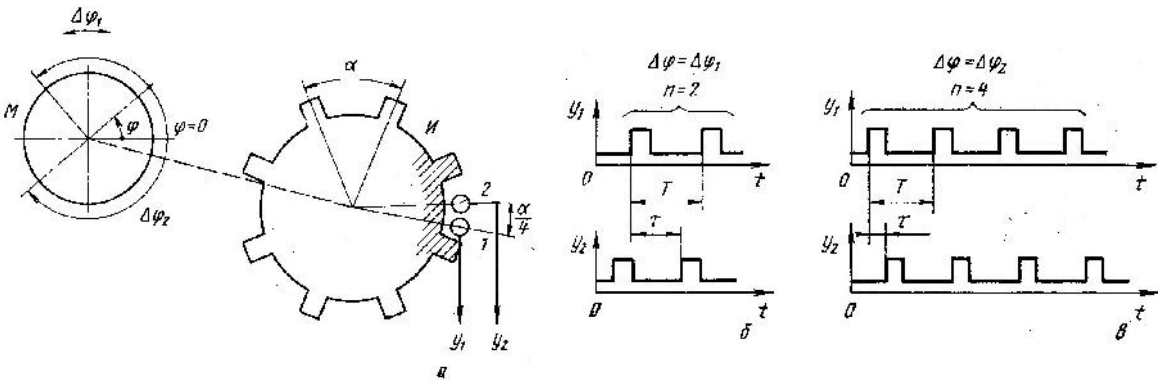
**n**

( )

( -

).

1 2



10.14 -

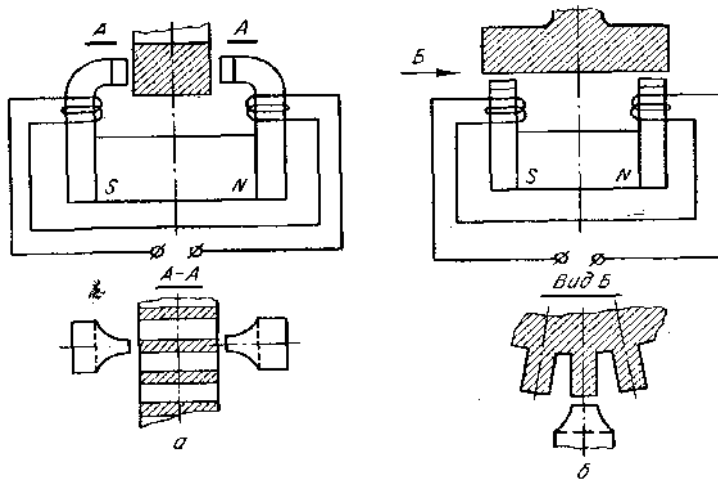
= 1

. 10.14, ,

2 - . 10.14, .

10.15).

-50,



10.15 -

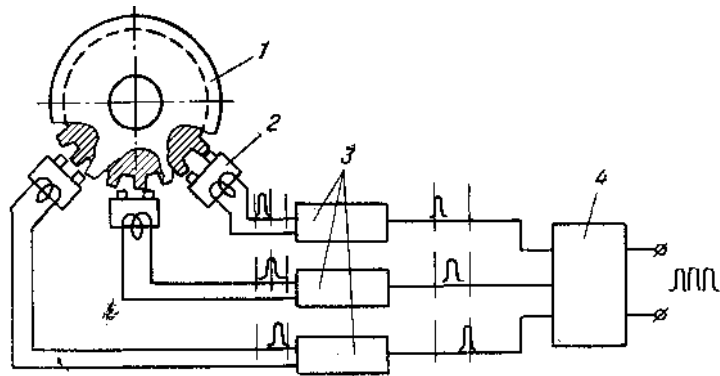
-100,

200,

( . 10.16).

1

2



10.16 -

120°

3

;

4,

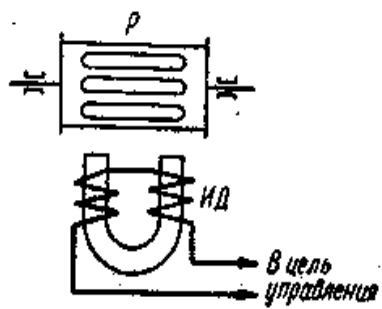
3 .

10.6.3.

10.17.

( ), (

),



10.17 -

10.6.4.

∴ ,  
 , .

. 10.18

( ) .  
 , ,  
 ( ), .  
 ,

,  
 .  
 .  
 .  
 =2 / ,

. 10.19

**n**

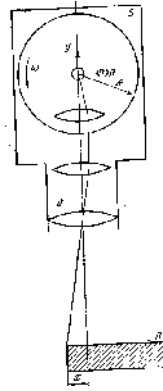
1, 2, ... **n**,

**m-**

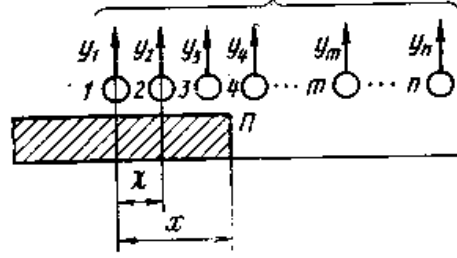
( **m** =1), - ( **m**=0),

1, 2..., **n** =( 1, 2, ..., **m**, ..., **n**) -

[ . 3.19 =1, 1, 1, 0...,0, ..., 0].



10.18 -



10.19 -

. 10.18 10.19,  
( )

[4].

10. 7.

( )

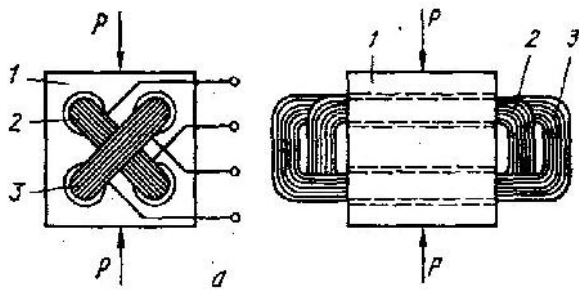
10.7.1.

2 3  
1.

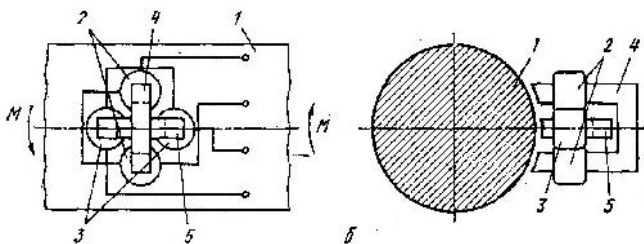
2 3  
4 5.

45°

90°



10.20 -



( )





( ) ,

10.7.2.

$$T = u(T - T_0), \quad (10.1)$$

$T -$  ;  $T -$

, ;  $u -$   
:

$$T = T - T_0, \quad (10.2)$$

$T -$  ;  $T -$  ;

$$T = (d / dt), \quad (3.3)$$

- ; -

$$T = k I, \quad (10.4)$$

$k -$  ,

; - ;  $I -$  .

(3.1) ... (3.3)

$$T = k \cdot I - (d/dt) \quad (10.5)$$

$$= U - IR \quad (10.6)$$

$$= k \quad (10.7)$$

U - ; R - ; k -

k k , (10.5) (10.7),

k = k .

(10.5)...(10.7)

$$T = (U - IR)I - (d/dt) \quad (10.8)$$

= f( )

T , , I, I

d/dt, T

(10.1) (10.5).

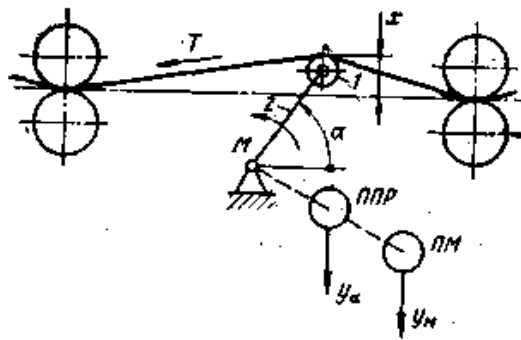
T , ,

U, I, d/dt ,

T (10.1) (10.8).

10.7.3.

. 10.21.



10.21 -

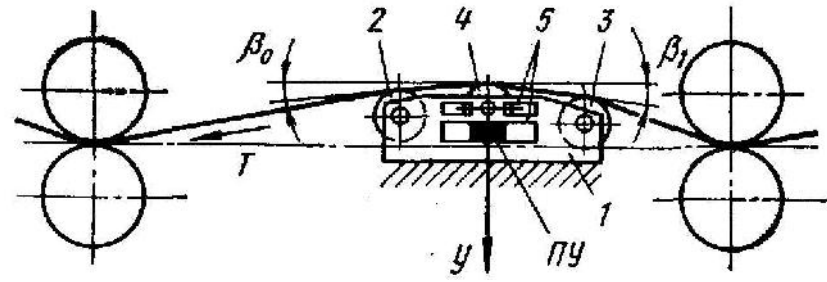
. 10.22.

1,

2 5

4.

5.



10.22 -

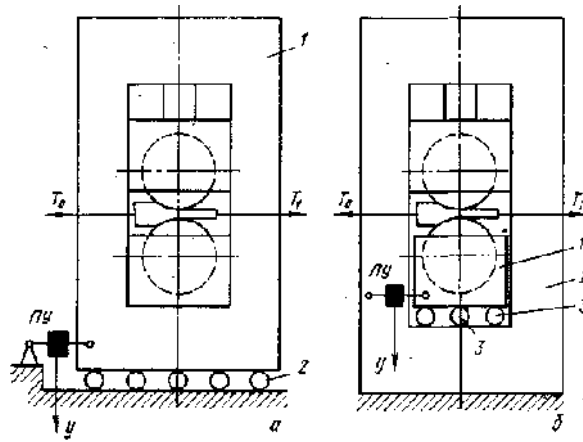
0 1.

[4].

1

2

. 10.23, .



10.23 -

( )

( )

( . 10.23, ).

2

3

1

, ( , ) ( , ) .

[4].

10.8.

10.8.1.

( ).

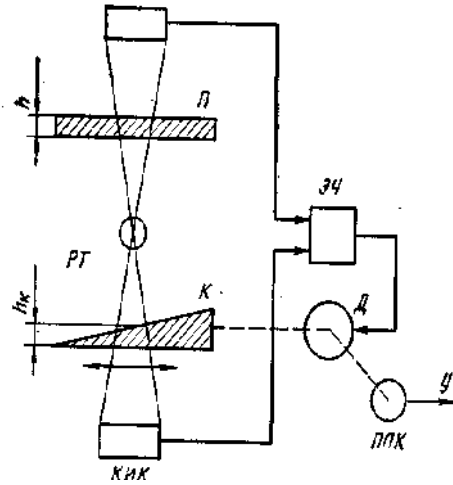
( )

( , )

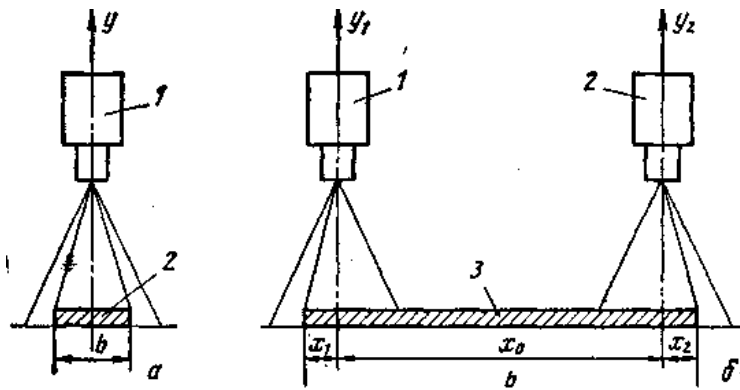
, .

$I$  ,  
 $I = I_0 e^{-\mu h}$  ,  $I_0$  -  
;  $\mu$  -  
;  $h$  -  
( - ) -  
0,3 , -  
1,2 .  
( , )  
).  
. 10.24.  
( ), ( )  
- , ,  
. ,  
 $h = h_K$ .  
h.





10.8.2.



10.25 –

10.25, .

1 **b** 2.

10.25, . 1 2

1 2

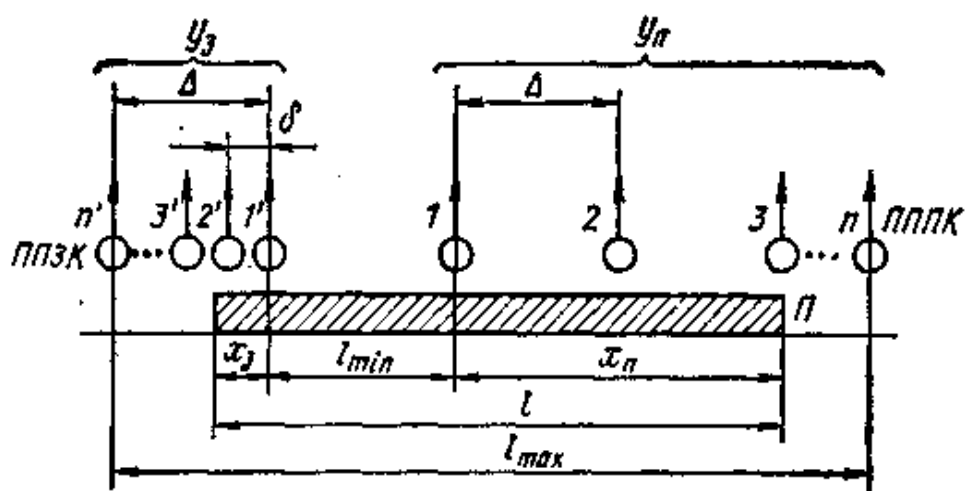
3 . **b=x<sub>0</sub>+x<sub>1</sub>+x<sub>2</sub>,** 0 -

( )

( )

10.8.3.

( 10.26)



10.26 -

1.

1, 2, ..., n,

1', 2'..., n',

$$=(n'-1) .$$

$l_{min}$

$n \ n' -$

$l_{max}.$

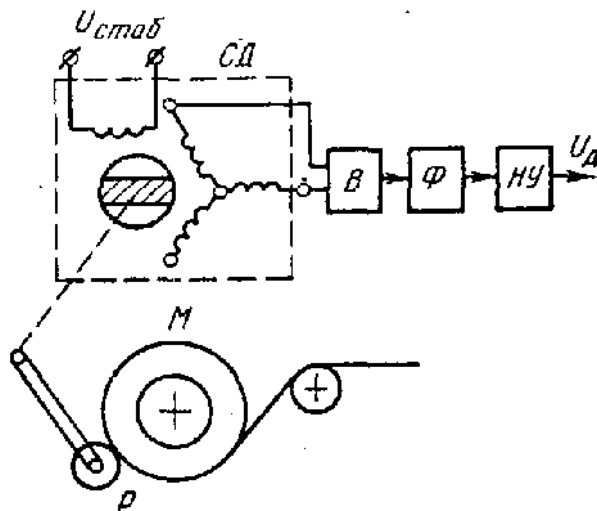
$$l = l_{min} + X + X .$$

( )

( ) .

10.8.4.

( . 10.27)



10.27 -

- ,  
, , .  
- .

