

ARC-

05.09.05 –

« -

»

:

,

:

,

« -

-

. . . .

»,

“

,

”;

”;

,

« -

-

-

»,

;

:

-

« -

-

»

«25» 2012 16

212.229.16

« -

» 195251, - , .

29, , .284.

« -

-

».

« » 2012 .

212.229.16

,

) . (-
 :
 ,
 . () .
 ,
 () .
 ,
 ,
 . , “
 ” , ..
 (, , ..)
 () .
 , .
 ,
 .

ARC- , -
 , -
 .

1. :
 , -
2. ()
3. (-
4.)
 ()
 , , -
5. . -
6. ARC-
 (); - -
 , - ..

_____.

, , , , , -
, , -
, . . .

1.

, , -

2.

()

, -

3.

- .

- () -

4.

. ()

, , -

5.

, - -

- . -

:

1.

(-

) ARC- : -

, “ ” , -

“ ”

2.

ARC- ,

, , .

3.

ARC- - -

. -

, , ,

, , , -

, -

-

, : , -

(,)

8 , 4

96

101

42

_____ :

1.

2.

3.

4.

5.

() 8- 16-

(-).

$[Q(s)]$

); P, Q, X, Y -

; $[P(s)]$ -

$W\{\bullet\}$

$[Q(s)]$ -

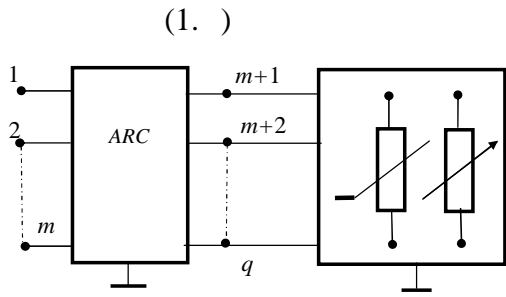
: $W\{\bullet\}$ -

, $W\{\bullet\}$ -

$W\{\bullet\}$ -

, $W_d\{\bullet\}$ -

, $W\{\bullet\}$ -



1.

. 1

ARC-

m-

$(m+1) \div q$

(),

().

(

1)

2,

(1.B)

A, B, C, D (

)

(1.)

$W(s), W \{ \bullet \},$

m-

()

$s = \{s_1, s_2, s_3, \dots, s_m\},$

AR

(1.)

$P(s) \quad Q(s)$

$$\begin{cases} P(s) = [P^t(s), P_n^t(s)]^t \\ Q(s) = [Q^t(s), Q_n^t(s)]^t \end{cases} \quad (2.3)$$

« » -

,

-

-

, t-

$$A(s) = [A_{ij}] ; i, j = 1, 2; [B(s)] = [B^t(s), B_n^t(s)]^t; [\quad (s)] = [\quad ^t(s), \quad ^t_n(s)]^t.$$

$$P(s), \dots, P^t(s) \quad (2.3)$$

$$P(s) = W \{ Q(s) \} = W ([A_{11}]P(s) + [A_{12}]P^t(s)) + W [B]X(s).$$

$$[A_{12}] = [0],$$

$$P(s) = (1 - W [A_{11}])^{-1} W [B]X(s),$$

(1.)

$$Y(s) = [C]P(s) + [C]P^t(s) + [D]X(s) = [[C](W^{-1} - [A_{11}])^{-1}[B] + [D]]X(s) + [C]P(s).$$

$Y(s)$

$H(s),$

$$H(s) = [C] [(W^{-1} - [A_{11}])^{-1}[B] + [D]],$$

$$Y(s) = H(s)X(s) + [C] P(s).$$

$$[C]^{-1} Y(s) = [C]^{-1} H(s)X(s) + P(s).$$

(1.)

$$p = \frac{d}{dt} \{\bullet\}, \quad p^{-1} = \int \{\bullet\} dt$$

$$pp^{-1} = p^{-1} \cdot p = 1$$

$$H(p_1, p_2, \dots, p_n) \Rightarrow H(p_{(n)})$$

$$1. \quad e^{-\frac{M(t)}{p^\varepsilon}} u_1(t), \quad M(t) - 0, \quad u_1(t) -$$

$$e^{-\frac{M(t)}{p^\varepsilon}} \delta_1(t) = \frac{A \delta_0(t)}{p + M(t)/p^{\varepsilon-1}}, \quad (3.1)$$

$$u_0(t) - (\quad), A -$$

$$1.1 \quad = 1 \quad M(t) = (\quad)$$

$$e^{-\frac{\alpha}{p}} \delta_1(t) = e^{-\alpha t} \delta_1(t) = \frac{A \delta_0(t)}{p + \alpha}; A = 1. \quad (3.2)$$

$$2. \quad e^{M(t)/p^\varepsilon} i(t) \delta_1(t)$$

$$H_0(t, p) \left\{ e^{\frac{M(t)}{p^\varepsilon}} i(t) \delta_1(t) \right\} = e^{\frac{M(t)}{p^\varepsilon}} H_0(t, p) + e^{\frac{M(t)}{p^{\varepsilon-1}}} i(t) \delta_1(t). \quad (3.3)$$

$H_0(t, p) -$

$$H(p_{(n)}) = \frac{N(p_{(n)})}{D(p_{(n)})}, \quad (3.4)$$

$$N(p_{(n)}) = \sum_{v_1=0}^1 \sum_{v_2=0}^1 \dots \sum_{v_n=0}^1 b_{v_n v_{n-1} \dots v_2 v_1} \prod_{k=1}^n p_k^{(1-v_k)}$$

$$D(p_{(n)}) = \sum_{v_1=0}^1 \sum_{v_2=0}^1 \dots \sum_{v_n=0}^1 a_{v_n v_{n-1} \dots v_2 v_1} \prod_{k=1}^n p_k^{(1-v_k)},$$

$$a_{v_n v_{n-1} \dots v_2 v_1} = \dots, \quad p_1 p_2 \dots p_n \{\cdot\} = \prod_{k=1}^n p_k \{\cdot\},$$

$$\begin{aligned} p_{(n)} \{f(t_1, t_2, \dots, t_n)\} &= \frac{d^n f(t_1, t_2, \dots, t_n)}{dt_1 dt_2 \dots dt_n} \frac{1}{(p_1, p_2, \dots, p_n)} \{\cdot\} = (p_1, p_2, \dots, p_n)^{-1} \{\cdot\} \Rightarrow \\ \Rightarrow p_{(n)}^{-1} \{\cdot\} &= \frac{\{\cdot\}}{p_{(n)}} \Rightarrow \int_0^{t_1} \int_0^{t_2} \dots \int_0^{t_n} f(t_1, t_2, \dots, t_n) dt_1 dt_2 \dots dt_n. \end{aligned}$$

n-

$$\frac{u_{0(n)}(t_{(n)})}{p_{(n)}} = u_{1(n)}(t_{(n)}),$$

(a÷c):

$$a) k(p_{(n)} + p_{(j)}) = kp_{(n)} + kp_{(j)};$$

$$b) p_{(n)} p_{(j)} = p_{(j)} p_{(n)} = p_{(r)} p_{(s-r)};$$

$$c) p_{(c)} (p_{(cn)} + p_{(j)}) = p_{(c)} p_{(cn)} + p_{(c)} p_{(j)},$$

k-

$$\dots, \quad \min(n, j); \quad \max(n, j). \quad (3.4)$$

$$F(s_1, s_2, \dots, s_n) = \int_0^\infty \int_0^\infty \dots \int_0^\infty f(t_1, t_2, \dots, t_n) e^{-\sum_{k=1}^n p_{k t_k}} dt_1 dt_2 \dots dt_n$$

(...)

(3.1 ÷ 3.4)

$$p^n U(t) - p^{n-1} U_0 u_0(t) - p^{n-2} U_0 u_0(t) - \dots - U_0^{(n-1)} u_{0(t)}$$

$$\int_0^t \int_0^t \dots \int_0^t i(t) dt^n = \frac{i(t)}{p^n} u_1(t) + \sum_{i=1}^n \frac{i_0^{-1}}{p^{n-i+1}}$$

R, L

(

$$p^s u(t) = f(p^r i(t)),$$

[u].

C()-

$$p^s u(t) = kp^r i(t) \Rightarrow u(t) = kp^{(r-s)} i(t);$$

$$r - s = \dots - 5, -1, 3, 7, \dots Z_0(j\check{S}) = -jk\check{S}^{(r-s)},$$

$$r - s = -1 -$$

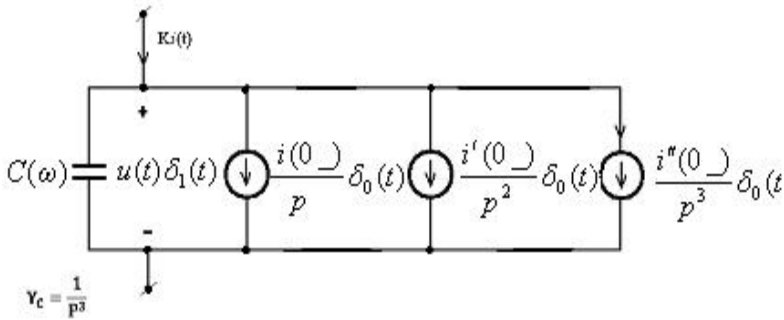
$$C = 1/k.$$

$$r - s = 3$$

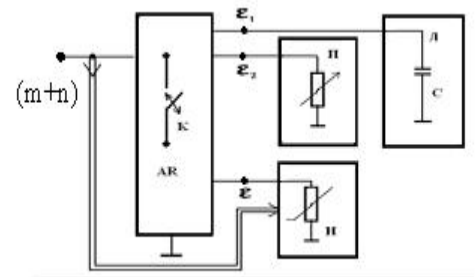
$$i(t)u_1(t) = \frac{1}{kp^3} \left\{ u(t)u_1(t) + \frac{1}{p} i(0_-)u_0(t) + \frac{1}{p^2} i'(0_-)u_0(t) + \frac{i''(0_-)}{p^3} u_0(t) \right\} \Rightarrow j\check{S}C(\check{S})U_m = I_m,$$

$$C = 1/k\omega^4.$$

3.



.3



.4

$$(3.1 \div 3.4) \quad p^{(n)}$$

()

(); “ ” -

.4, AR-

“ ” -

. AR-

m-

n-

(<)

) C₁ -

“ ”

2-

“C” (1-

(2.1),

P_(i),

(i) ∈ {S}

(.4).

$$[H(p_{(S)})] = [D(\tilde{p}_{(S)})] + [C(\tilde{p}_{(S)})] \cdot \{p[1u_{p_i}] - [A(p)]\}^{-1} [B(\tilde{p}_{(S)})]$$

$$\tilde{p}_{S_{p_i}} \in \{p_1, p, \dots, p_{i-1}, p_{i+1}, \dots, p_S\}, [H(p_{S_{p_i}})] -$$

:

$$[H_0(p_{(s)})] = \begin{bmatrix} [D(\tilde{p}_{(s_{p_i})})] & [C(\tilde{p}_{(s_{p_i})})] \\ [B(\tilde{p}_{(s_{p_i})})] & p[\mathbf{1u}_{p_i}] - [A(\tilde{p}_{(s_{p_i})})] \end{bmatrix} \quad (3.5)$$

$\mathbf{1u}_{p_i}$ -

(3.5)

p_i

:

$$[H_1(p_{(s)})] = [D] + [C][diag\{p_1[\mathbf{1u}_{p_1}], p_2[\mathbf{1u}_{p_2}], \dots, p_s[\mathbf{1u}_{p_s}]\} - [A]]^{-1}[B] \quad (3.6)$$

[]·[B]-

(1.)

()

(3.6)

(S) = (p₁, p₂).

$$[H(p_1, U_1)] = \begin{bmatrix} \frac{p_1 U_1}{p_1 + U_1} & \frac{1}{p_1 + U_1} \end{bmatrix}_{2 \times 1}^t,$$

$$U_1 \rightarrow p_2; [U_2, U_3]^t = [H(p_1 p_2)] U_1,$$

U_1

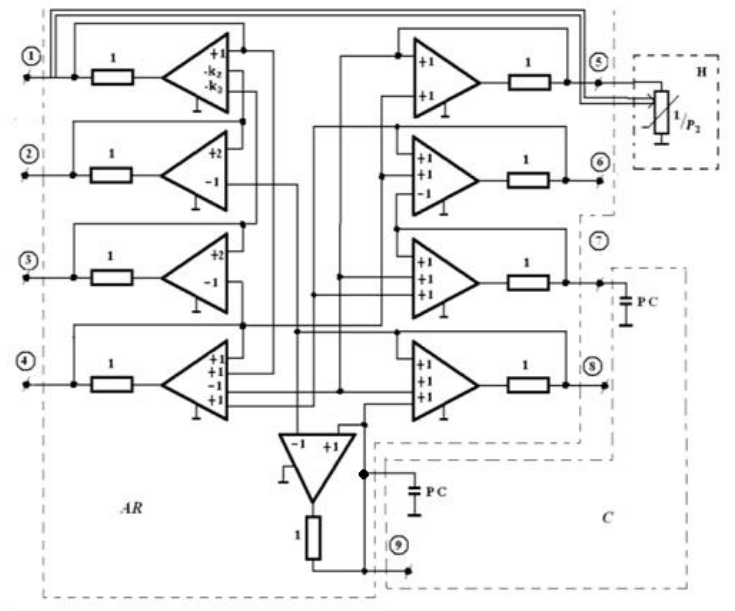
p_2 .

$$[Y(p_1 p_2)] = \begin{bmatrix} 0 & K_2 & K_3 \\ \frac{p_1 p_2}{p_1 + p_2} & -1 & 0 \\ \frac{1}{p_1 + p_2} & 0 & -1 \end{bmatrix}; \begin{cases} U_2(p_1 p_2) = \frac{p_1 p_2}{p_1 + p_2} \cdot U_1 \\ U_3(p_1 p_2) = \frac{1}{p_1 + p_2} \cdot U_1 \end{cases}$$

(K₂, K₃ -

$$[Y_1(p_1 p_2)]_0 = \begin{bmatrix} 0 & K_2 & K_3 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 \\ -1 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & \frac{1}{p_2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & -1 & p_1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & p_1 \end{bmatrix}.$$

$(p_1), \quad (1/p_2),$
 $[Y_1(p_1 p_2)]$
 . 5. ,
 (,
),
 (5)
 (9) (7),
 , 9 -
 AR, , C.
 $G = kV_1$ $R = k_1 V_1.$



. 5

$$[H(s_1, s_2)]_{2 \times 2} = \frac{1}{s_1 s_2 + 5s_1 + 6} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}_{2 \times 2}.$$

(3.5)

$$[H_1(s_1, s_2)]_{2 \times 2} = \frac{1}{(s_1 + a_1)(s_2 + a_2) + 5(s_1 + a_1) + 6} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \Rightarrow$$

$$\Rightarrow [H_2^2(s_1, s_2)]_{7 \times 7} = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ -1 & 6 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & -1 & 0 & 0 & 0 & 1 \\ \hline 0 & 0 & 0 & -1 & 0 & s_1 + a_1 & 0 \\ 0 & 0 & 0 & 0 & -1 & 0 & s_2 + a_2 + 5 \end{bmatrix}_{7 \times 7}$$

$a_1 \quad a_2$

[]:

$$[A(a)] = \begin{bmatrix} -a_1 & 0 \\ 0 & -(a_2 + 5) \end{bmatrix}$$

[B] [C] - .

ARC-

2).

$$[G_p] = \begin{bmatrix} 1 & -1 & 0 & 0 & 0 & 0 & 0 \\ -1 & 6 & 0 & -1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 2 & 0 & -1 \\ 0 & 0 & 0 & 0 & 0 & (s_1 + a_1) & 0 \\ 0 & 0 & 0 & 0 & -1 & 0 & s_2 + a_2 + 4 + 1 \end{bmatrix}$$

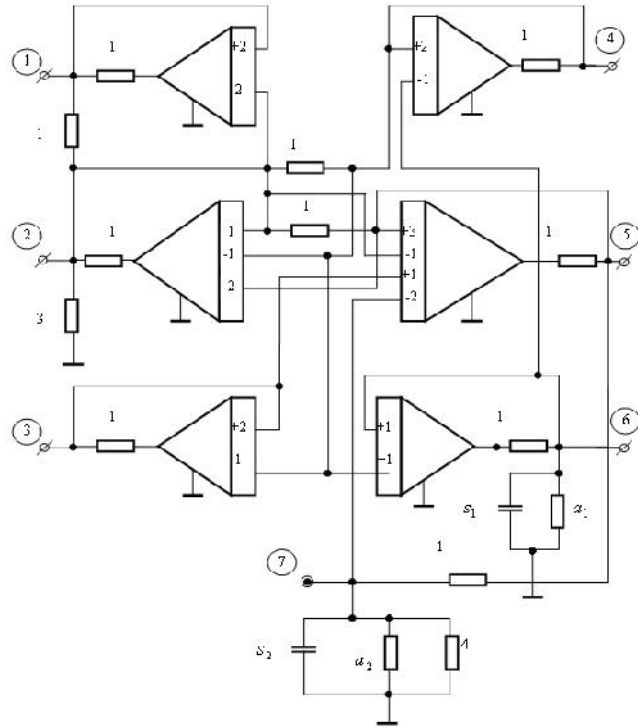
« » :

$$[G_a] = [H_2^2(s_1, s_2)] - [G_p] = \begin{bmatrix} -1 & 2 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 2 & 0 & 0 \\ 0 & 0 & -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 1 & 0 \\ 0 & 1 & -1 & 0 & -2 & 0 & 2 \\ 0 & 0 & 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}_{7 \times 7}$$

$[H_1(s_1, s_2)]$. 6 (-
) . () -
 :

$$[k] = [1] - [G_d] \cdot [G_a],$$

$$[G_d] = \text{diag}\{1, 1, 0, 1, 1, 0, 1\}.$$



. 6

:

1.

,

2.

. 1

3.

4.

5.

6.

7. -
8. (-
)

1. **RLC** -
/ . . . , . . . , . . . , . . .
, . . . // - -
. - 2009. - .1, 89. - .202-207.

2. , . . -
/ . . . , . . . , . . . // “ -
” - 2009. - 4. - .27-30.

3. , . . **ARC-**
R- / . . . , . . . // -
. - 2010. - 2(23). - .193-197.

4. , . . -
/ . . . , . . . , . . .
// . - 2011. - 28, . - .117-121.

5. , . . -
/ . . . // 66- , -
. . 4.: . . . / . . . , . . . [.]. -
: - , 2008. - .5-8.

6. , . . / . . . -
// . - 2011. - .161-163.

7. .2002303 / . . . , . . . -
, . . . , . . . ;
- . - 4924262 ; .2.04.91 ; .30.10.1993, . 39-40 (.). - 4 .

8. , . . - : . /
. . . , . . . , . . . ; - - : ,
2011. - 134 .