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LOGICAL PROBABILITY

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Conditions are being created for the further development of science, including the science of mathematics, in particular probability theory and Mathematical Statistics and mathematical logic, the wide involvement of talented and talented young people in scientific activities, the realization of their creative and intellectual potential.

Below, with probability theory, we would like to use the "encounter" of mathematical logic theory at "boundary" points to apply them to relay-contact circuits (RCC). To state such proportionality:

Probability theory $A_1, A_2, \ldots$ incidents

$A_1, A_2, \ldots$ considerations in mathematical logic

$A_1, A_2, \ldots$ connectors at RCC call it

$P(A) - A$ probability of an incident and

$$0 \le P(A) \le 1$$

is the dimensional function in the range.

Also, A reasoning $\{0,1\}$, (0 false, 1 true) takes a value from a two element set.

Some issues can be solved by applying RCC using elements of probability theory and mathematical logic theory.

Probleme. The following three connector schemes are given. One scheme of 3 was taken at risk. Find the probability that the current (energy) will pass according to the scheme taken at this risk.

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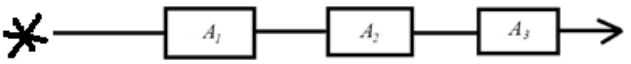
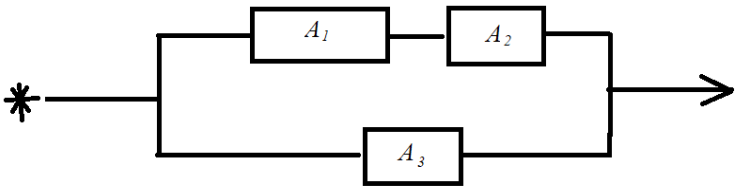
I.



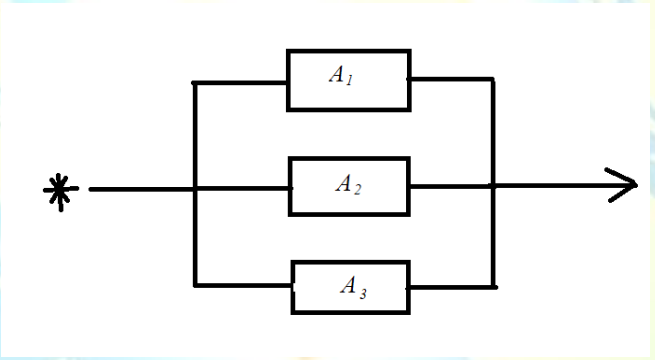
Sequential scheme

II.



Mixed scheme

III.



Parallel scheme

there can be no other option than schemes I,II,III

Solution 1. We use the conditional probability formula.

To let the transition Event B be,

$$B = A_1B + A_2B + A_3B$$

$$P(B) = \sum_{i=1}^{3} BA_i$$

Total number of chance $2^3 = 8$.

$$P(B) = P(B|A_1)P(A_1) + P(B|A_2)P(A_2) + P(B|A_3)P(A_3) =$$

$$= \frac{1}{8}\cdot\frac{1}{3} + \frac{5}{8}\cdot\frac{1}{3} + \frac{7}{8}\cdot\frac{1}{3} = \frac{1}{3}\cdot\frac{13}{8} = \frac{13}{24}.$$

Solution 2. With mathematical logic,it is also possible to find the probability of a current transition from schemes I,II, III, even with a table of rostness, in which the 0 – current tok "does not pass", the 1 – current tok denotes the concept of "passes".

The logical formulas for RCC I, II, and III would be:

I. $U_1(A_1, A_2, A_3) = (A_1 \wedge A_2 \wedge A_3)$

II. $U_2(A_1, A_2, A_3) = (A_1 \wedge A_2) \vee A_3)$

III. $U_3(A_1, A_2, A_3) = (A_1 \vee A_2 \vee A_3)$

We make a table of truth to these formulas:

A_1	A_2	A_3
0	0	0
0	0	1
0	1	0
1	0	0
1	0	1
1	1	0
0	1	1
1	1	1

for U_1

$A_1 \wedge A_2$	$A_1 \wedge A_2 \wedge A_3$
0	0
0	0
0	0
0	0
1	0
0	0
0	0
1	1

1/8

for U_2

$A_1 \wedge A_2$	$A_1 \wedge A_2 \vee A_3$
0	0
0	1
0	0
1	0
0	1
0	1
1	1
1	1

5/8

for U_3

$A_1 \vee A_2$	$A_1 \vee A_2 \vee A_3$

0	0
0	1
1	1
1	1
1	1
1	1
1	1
1	1

7/8

Accordingly, I- probability of energy transition from the scheme is 1/8,

II- probability of energy transition from the scheme is 5/8

III- probability of energy transition from the scheme is 7/8

The probability that energy will not pass is $P(\bar{T}) = \mathbf{1} - P(T)$ respectively $7/8$, $3/8$ and equal to $1/8$

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