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Topic: Experiments and events

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Abstract: Let's give some conditions set S. Each realization of the conditions will call experience and the experiment S. Such designation of the term experience is sufficiently general to responds as passive experiments (which take place without the influence and possibility of influence by man) and the active (person who organizes and conducts a particular purpose).

Each experiment result of the S command event is about experiment S.

In deeper study of natural and social phenomena shows that there are quite a few laws that are strictly determined and that most of the experiments have elements of chance.

1. Field of random events

Reliable event of experiment S is an event that occurs every time realization of S. Impossible event experiment S is an event that never occurs during the execution of S.

If performed experiments and event n S, then in determining safe event occur n times, and never once impossible, ie 0 times. So the relative frequency foolproof event is 1, and the impossible is 0. This applies to any series of any number of experiments S. Accordingly foolproof event and the impossible event's circumstances are met and they are random events.

2. Operations on random events

All events are reviewed will consider in connection with the same experiment S, ie they are a subset of the same set of elementary events Ω and Ω appears in the role of so-called Universal set.

For the event A we say that pulls event B if every time you appear event A occurs and the event B. For example the event "fallen two spots" pulls event "fell even number spots" in the experiment throwing cube to play.

If event A entails event B and event B pulls event A, then we say that the events A and B are equal and write A = B.

Sum of events A and B is the event that appears then, and only then when there is at least one of those events. It is determined by a set of elementary events which is a union of many elementary nastaniza event A and event B.

Multiplication of events A and B is the event that appears and then only when they occur both events. It is determined by a set elemenentarni events simultaneously determine both events.

Example 1:

On table we throw gamble coin of 1 denar coin and 5 denars and note the value on top of the three objects. With set to describe:

a) all possible outcomes;

b) event A: the sum of values is even;

c) the event B: all objects have odd value;

d) Event C: the sum of the values of all facilities is divisible by 3, but not even.

Solution:

S: throwing cube, 1 dinar coin, coin of 5 denars is an experiment that can be repeated any number of times. The cube appears one of six possibilities: appeared 1, 2, 3, 4, 5, or 6 points, and coins can turn to page number or page with your back.a) Ω={(x_1, x_2 x_3) | x_1 [{1, 2, 3, 4, 5, 6}, x_2 [{1, г}, x_2 [{1, г}}

Ω={(1,1,5), (1, 1, г), (1, г, 5), (1, г ,г), (2, 1 , 5), (2, 1 ,г), (2, г ,5), (2, г ,г), (3, 1 ,5), (3, 1, г), (3, г, 5), (3, г , г), (4, 1 ,5), (4, 1 ,г), (4, г ,5), (4, г, г), (5, 1, 5), (5, 1, г), (5, г, 5), (5, г, г), (6, 1 , 5), (6, 1, г), (6, г ,5), (6, г , г)}

| Ω | = 6 * 2 * 2 = 24

б) A= {(1, 1, г), (1, г, 5), (3, 1, г), (3, г, 5), (5, 1, г), (5, г, 5), (2, 1, 5), (4, 1, 5), (6, 1, 5), (2, г, г), (4, г, г) (6, г, г)}

| A | = 12

в) To appear on all three objects odd value, both coins should be side by side with a number.

B = {(1, 1, 5), (3, 1, 5), (5, 1, 5)}

| B | = 3

г) C= {(2, 1, г), (3, г, г), (3, 1, 5), (4, г, 5)}

| C | = 4

Example 2:

b) B: the aim has been missed;

c) C: target hit just the first;

d) D: the aim is only one hit;

e) E: first shooter to hit the target;

f) F: first and second opposing shooter results achieved;

Solution:

Experiment observed is "firing order". Possible outcomes:

Si - i-th shooter hit the target; i = 1, 2, 3, 4

$\overline{S_i}$ – i-th shooter missed the target; i=1, 2, 3, 4

а) A: hit the target at least one of the shooters:

$A= S_1 \cup S_2 \cup S_3 \cup S_4$

б) B: all four firing is accomplished failure:

$B = \overline{S_1}\,\overline{S_2}\,\overline{S_3}\,\overline{S_4}$

The events A and B are opposite events.

$AB= \emptyset,\ A= \overline{B},\ \overline{A} = B,\ A+B = \Omega$

в) C: first shooter made a goal, second, third and fourth missed:

$C = S_1\,\overline{S_2}\,\overline{S_3}\,\overline{S_4}$

г) D: target hit or just the first or only the second or only third or only fourth:

$D = S_1\,\overline{S_2}\,\overline{S_3}\,\overline{S_4} + \overline{S_1}\,S_2\,\overline{S_3}\,\overline{S_4} + \overline{S_1}\,\overline{S_2}\,S_3\,\overline{S_4} + \overline{S_1}\,\overline{S_2}\,\overline{S_3}\,S_4$

д) E: first hits the target, and the remaining three shooters scored or missed.

$E: (S_1S_2S_3S_4) \cup (S_1S_2S_3\overline{S_4}) \cup (S_1S_2\overline{S_3}S_4) \cup (S_1\overline{S_2}S_3S_4) \cup (S_1S_2\overline{S_3}\,\overline{S_4}) \cup (S_1\overline{S_2}S_3\overline{S_4}) \cup$

$(S_1\overline{S_2}\,\overline{S_3}S_4) \cup (S_1\overline{S_2}\,\overline{S_3}\,\overline{S_4})$

$E=S_1$

ѓ) F: the first shot and missed the second, or the first missed, and the second hit:

$F = S_1\overline{S_2} \cup \overline{S_1}S_2$