

Good example of coins, births and other random events essay

[Sport & Tourism](#), [Football](#)



A coin toss is an action frequently used in everyday life and the theory of probability (e. g., in a probabilistic Turing machine) as a " random generator", outstanding receiver two possible signal: " heads" or " tails". Can be used both as a game and when the need for the random solution of two equally of acceptable (for example, draw in different sports).

Theoretical and experimental analysis shows that the result is predictable to a certain extent, at least, if you know the initial data - location, speed and momentum. The coin toss may well be considered as a problem from the Lagrangian mechanics. An important aspect is the rotational movement of coin, its irregular vibrations and also possibility to rebound at the end of the fall trajectory.

Problem prediction result of the coin flip involved Percy Diaconis (American mathematician and former professional magician) and his staff. They have demonstrated that using a mechanical flipper, the ability to produce cast with strictly specified parameters, the result is quite predictable drop-down. Furthermore, they were theoretically and experimentally proved that there is a technique that allows throwing a coin so that it does not roll over, and apparently throw will look very ordinary. Such techniques can master, say, magicians or professional players.

In rare cases, the result of a coin toss can stand on the edge (5 cent coin the probability is about 1/6000)

Back to the question, we need to discuss:

“ Is the coin toss at the beginning of a football game fair?”

As we know, before the match coin tosses judge. Thus, the process of flipping a coin is not completely random event, and depends on the actions

of the individual. This casts doubt on the integrity of the experiment. This view supports a number of mathematicians.

Coin toss does not guarantee decision randomly, as it leaves the possibility for fraud. This conclusion was Canadian mathematics from the University of British Columbia. During the experiment, the scientists suggested 13 visitors receiving a local doctor to flip a coin.

However, they promised that the two participants who often "heads" will receive a free coffee. Participants were shown the "correct" technique tossing a coin, which allows you to get the desired result by adjusting the height, flight time and number of revolutions the coin in the air. After that they were given the opportunity to practice. All subjects were thrown "heads" more times than "tails." Half the participants the difference was "significant." On average, "heads" dropped in 57 % of cases. The winner managed to throw the "heads" in 68 % of coin tosses.

In classical physics, when you flip a coin, the probability of its incidence is not equal to 50: 50. Using the weight of the initial data, the probability of appearance of tails or heads can calculate with a high precision.

Andreas Albrecht (Andreas Albrecht) and Daniel Phillips (Daniel Phillips) from the University of California at Davis (USA) argue that it is not. In contrast, well-known, but not analyzed the physical mechanisms increase the importance of quantum processes in a number of phenomena of the world, and the probability of heads / tails in practice is a quantum. And not only that, but almost all the so-called random events.

In support of this concept they bring unexpected idealized flow of molecules colliding with each other, conditional "billiard balls." According to

Heisenberg's uncertainty principle, the trajectory of such a molecule is inherently uncertain. Introducing various parameters radius, the mean free (without collisions) path, the average velocity and the mass of "billiard balls" as a parameter in a couple of simple equations, the researchers conclude that this uncertainty is growing literally every collision of the molecules together.

According to their point of view, thanks to random collisions water and air (for simplicity, they took only nitrogen in the air) have such a huge degree of uncertainty that literally every fluctuation in the properties of these substances has a fully quantum-mechanical origin. Accordingly, the incident through media such coin (and plane flying through them) in its mission, in fact, faced with almost pure quantum-mechanical processes! But that's not all.

Normal thrown upwards and tighten with a coin makes about a half-turn in the millisecond. However, the initial parameters of the coin are largely determined by the temporal uncertainty in neural processes described by the number of open ion channels in neurons. But here are the fluctuations in these channels due to Brownian motion of the molecules in the liquid polypeptides, which is basically water. And water, as has been shown, to a great extent is controlled by quantum-mechanical process.

Nevertheless, the main factors affecting the process of flipping coin randomness in football are:

- 1) The experiment performs a specific particular person
- 2) Coin is not ideal, symmetrical, the center of mass in her anyway biased.

However, if we assume that the judge is honest, then the displacement of

the center mass of the coin will have little impact on the randomness of the process. Of course, it had some teams have some more, but this advantage is not essential to a coin flip.