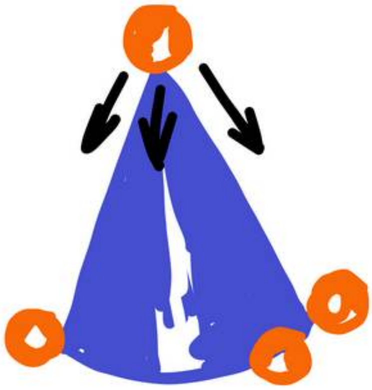
The meaning of Probability

There is a conus. There are balls which are dropped into the center of the top of conus. See Fig. 1. What happens?



Nothing special, balls will fall randomly over the area of the cone.
What will be the distribution of the balls around the base of the cone?

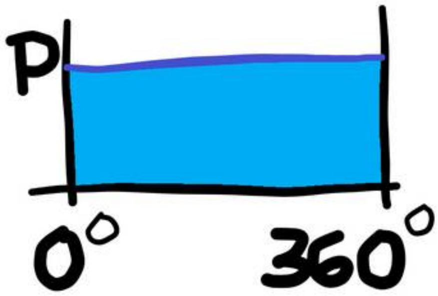
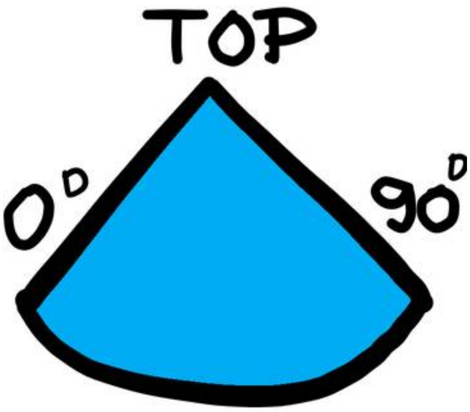


Fig.1 – the cone with balls with line of a distribution P of balls

See the Fig. 1 – the probability, the distribution of dropped balls will be equal to P around the base of the cone. From the angle 0° to the angle 360°. No direction will be prefered.



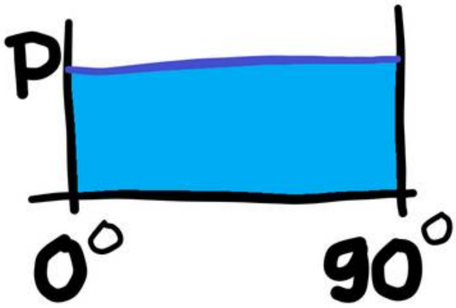


Fig.2 – a developed area of the cone to the right angle with the graph of the distribution P

We will now limit the range of ball drops to 90° from the top of the cone. See Fig. 2. The distribution of ball will be the same like in the Fig. 1 but only from the angle 0° to the angle 90°. No preferred angle as indicated by the laws of probability. **We could call such distribution the Continuity.**

We will now make a Galton board on the developed area of the cone from the angle 0° to the angle 90°. See Fig. 3.

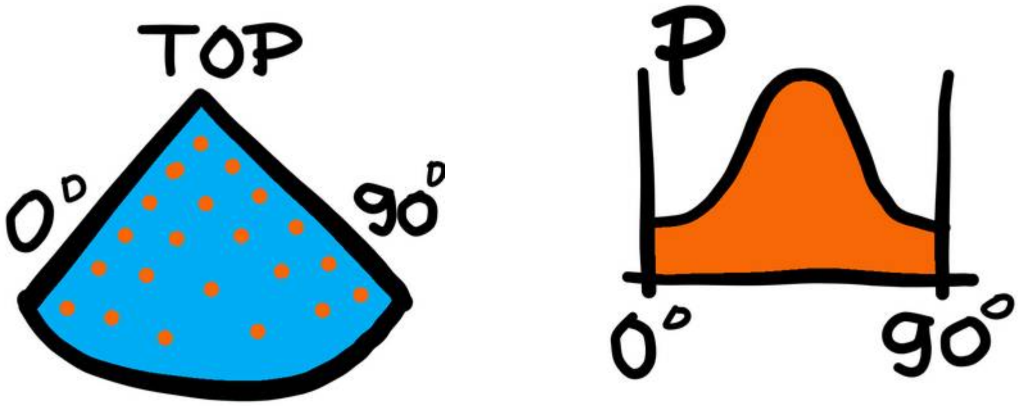


Fig.3 – a developed area of the cone to the right angle with pegs of Galton board with a curve of a distribution P of balls

There are 7 boxes at the base of the cone. The balls fill these boxes irregularly. See Gaussian distribution – Fig. 3. Such distribution is given by boxes or limits (see pegs on the Galton board). **By these limits (pegs) we obtain discrete values – the distribution P of balls in boxes.** Yes, we know every passage of every ball through the board is an original, unrepeteable (the movement, the rotation). The Continuity still exist, if we want to compare every passage of every ball. But this Continuity is **the microstate**. And the Gaussian distribution P is **the macrostate.**

The conclusion: **Discretion is modulated on Continuity.** Every passage of every ball through Galton board is unrepeteable original. But such passages is binding through given limits. In physics see Planck constant which limit possibilities how to complet atom shells (orbits) with electrons.

There is no fatal difference between the order and the chaos. In both cases, the Gauss distribution curve will be satisfied.

In case of the order, the distribution of balls in the lower boxes will correspond to the ideal Gauss curve. In the event of chaos, the actual distribution of balls in the boxes will only get closer to the ideal curve.

For example, a coin toss or the passage of balls through only one peg of the Galton board. There are only two outcomes, two sides – left and right. In the case of order, the sides will change regularly, predictable. See Fig.4.

In case of chaos, it will depend on the number of throws. The greater the number of throws, the greater the number where only one side falls. That's the way it has to be. There can be no more than two, three or five or seven sides falling. Then the probability of another throw would decrease. But the probability are still the same for any throw regardless of the number of previous throws.

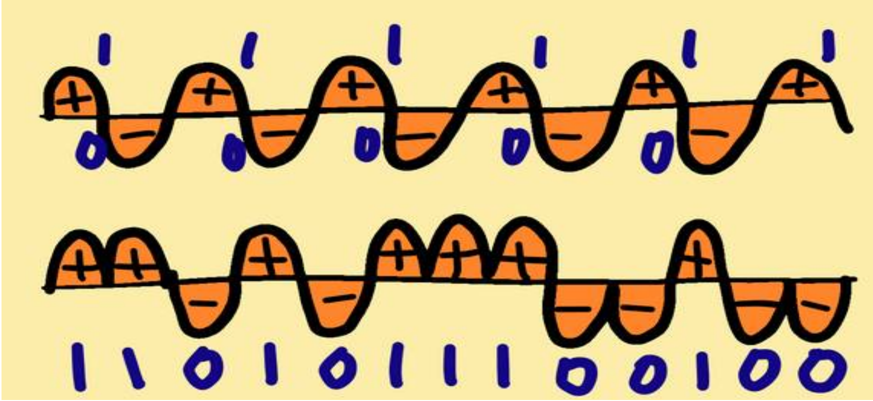


Fig. 4 – the regular outcomes and the irregular outcomes in probability, the marks I an 0 represents two sides – right (I) and left (0).

Interesting question – what happens if we break the series of throws. How can distribution know what will be, or when it will be interrupted?

Anyway. To toss repeatably one coin there must be series with one side only. Compare it with the Galton board. We fall down balls, step by step, after the previous one reach the box. Write the sides during the ball goes through the pegs.

Or write down sides on the first peg. Sometimes there were a lot of one side on he first peg.

Let's give an example in the 10-coin toss. The fact that when throwing 10 coins all sides fall is 2-10. In other words, we have to make at least 1024 throws to get the same side of all 10 coins. Of course, all sides will fall sooner or later, not at exactly 1024 toss. The important thing is - the more times we repeat the 1024 series, the closer we get to 1024.

Go back to our conus. There is an important conclusion.

We can placed pegs freely on the conus surface. I mean the top peg, the others under it have precisely configuration. There are infinity possibilities how to placed Galton board on the surface of conus. What is the scale against infinity? Nothing! We can only compare relationships between discrete quantities. See the pegs layout on the Galton board. Just like we can compare one co-ordinated space to another co-ordinated space. The basic unit cannot be infinity, but some discreet value.

Discretization has to lead to continuity. The discretization is modulated on continuity. For the reason in the beginnig there was and is and will be, no doubt, continuity.

Each ball will pass through a different path - as many possibilities of passing through the Galton board of so many different paths. However, some different paths end in the same box. This is the basis of the ball distribution in the lower boxes, which we call Gaussian normal distribution.
The probability of 0000 or IIII or OIOI or IIOI or others is the same. But the probability to fill boxes is different. It depends of the point of view. If we could see every path of every ball through Galton board, we could see another movement or rotation of every ball passing through. That´s all.

Probability – discrete

Every process is unique instead of boxes (limits), Uniqueness is bonding to limits – see bilogical species or Planck radiation law, line spectra – see below

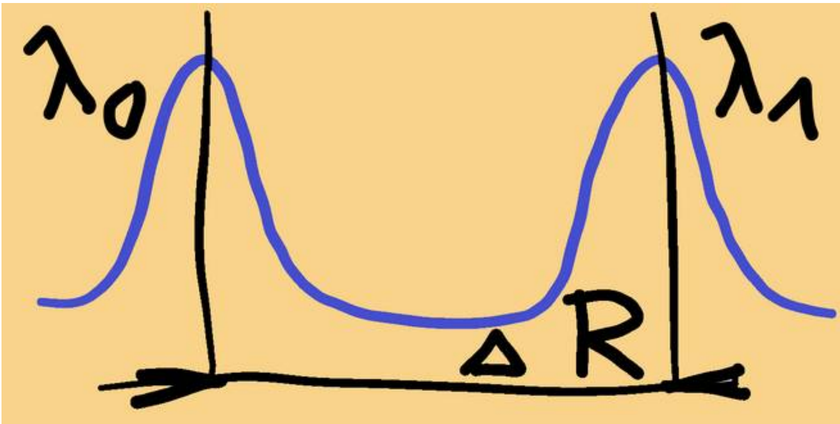


Fig. 4 – the two wavelenghts λ of ELMG radiation, ΔR means the distance bettween two peak of line spectra

Every line spectrum is different to each other. Of course, there are very small differences, but they differ to each other.

Discretization - this is only our ideas. In fact, there is continuity everywhere. Each process is unique, unrepeatable. No reversible time arrow is possible due to the uniqueness of each vacuum fluctuation. Therefore, every passage of balls through the Galton board is unique. There are no two identical passages, given by the quantum state.

Matter - atoms appear discreet. In fact, these are the maximum interference patterns of waves running through the universe through the vacuum fluctuations of quantum foam. Again, this is a connection to individual maxims, which we call particles of matter according to the laws of probability. Thus, it is a seeming discretion that is modulated to continuit

to be continued