The Mathematics of Ion Saliu’s Paradox

\[ 1 - \frac{1}{e} = .632120558828558... \]

By Ion Saliu

We start with one of the steps leading to the **Fundamental Formula of Gambling (FFG)**:

\[ 1 - DC = (1 - p)^N \]

**DC** represents the **degree of certainty**, **p** represents the **probability**, and **N** represents the **number of trials**.

We can express the probability as \( p = \frac{1}{N} \); e.g. the probability of getting one point face when rolling a die is **1 in 6** or \( p = \frac{1}{6} \)

It is common sense that if we repeat the event \( N \) times we expect one success. That might be true for an extraordinarily large number of trials. If we repeat the event \( N \) times, we are NOT guaranteed to win. If we play roulette 38 consecutive spins, the chance to win is significantly less than 1!

\[ 1 - DC = (1 - \frac{1}{N})^N \]

I noticed that \( (1 - \frac{1}{N})^N \) has a limit: \( \frac{1}{e} \) (\( e \) is the base of the **natural logarithm (In)**).

\[ 1 - DC = \frac{1}{e} \]

Thusly:

\[ DC = \lim (1 - \frac{1}{e}) = .632120558828558... \]
Soon after I published my glorious page on theory of probability (in 2004), the adverse reactions were instantaneous. I even received multiple hostile emails from the same individual! Basically, they considered my $\frac{1}{e}$ discovery as idiocy! “You are mathematically challenged”, they were cursing! Guess, what? I saw in 2012 an edited page of Wikipedia ($e$ constant) where my $\frac{1}{e}$ discovery is considered correct mathematics. Of course, they do not give me credit for that. Nor do they demonstrate mathematically the $\frac{1}{e}$ relation — because they don’t know the demonstration (as of March 21, 2012)!

You see the mathematical proof right here, for the first time.

$$e = (1 + \frac{1}{N})^N$$

Let’s demonstrate that:

$$\left(1 - \frac{1}{N}\right)^N = \frac{1}{e} = \frac{1}{(1 + \frac{1}{N})^N}$$

If 2 relations are equal, then their $N$th roots are also equal:

$$\left(1 - \frac{1}{N}\right) = \frac{1}{(1 + \frac{1}{N})^N}$$

$$\lim(1 - \frac{1}{N} \pm \frac{1}{N} - \frac{1}{N^2}) = \lim(1 - \frac{1}{N^2}) = 1$$

when $N$ tends to Infinity. Therefore:

$$\left(1 - \frac{1}{N}\right)^N = \frac{1}{e}$$

QED.