Power Regression as an Example of the Third Law of Hotels in Paris: Planets

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Abstract

All of the linear term regression model: Four ways too functional equation from the normal equations; obtaining normal equations from the functional equation by differentiation; variance analysis; extrapolation in Appell regression; improve the accuracy formula the isochronism; the number of Eulerian model; the statistical reliability, F-statistics; interpolation probabilities. All about power regression: four ways to display a functional equation of the normal equations; obtain the normal equations from the functional equation by differentiating; analysis of variance; extrapolation of the power of the regression flexicurity the accuracy with Juventus of the formula to My Short List's third law Euler number: statistical reliability: F-statistics; interpolation of probabilities, MATLAB, the standard normal probability calculators.

Keywords: The formula; The isochronism; Functional equation; Normal equations; Differentiation; Variance analysis; Extrapolation; The number of Eulerian model; The statistical reliability; F-statistics; Interpolation probabilities; Formula of hotels in Paris third law; Functional equation; Normal equation; Differentiation; Analysis of variance; Extrapolation; Euler number; Statistical reliability; F-statistics; Interpolation of probabilities; MATLAB; Standard normal probability calculators.

Introduction

Use the regression in the physics celestial bodies

Sustainable related to statistics as to the stress hormones subject can overcome this article. In the minds of most statistics is fundamentally one of the parties-counting manufactured products, physical products, etc. But when such calculations may lead to the opening of world significance, statistics captures the spirit of the! (Figures 1 and 2).

The author as a child lived in a garrison. The toys were on paper, paper plants strategic missiles and thin, like mannequins, anti-aircraft missiles... But childhood continues. So "Astrology and John Figure 1) was opened by the third act the motions of the planets, for which the current could get Nobel Peace prize , we can now for half an hour repeat his path, historically, as it was.

The author of the article "the laws isochronism" Mr. Chris Impy [1] noted: "The laws isochronism apply to any orbital movement, whether the planet around the Sun, the moon around the Earth, or stars around the center of the galaxy.

The second and third laws were not the result of isochronism attempts to find patterns in orbits planets. The second and third laws isochronism studying mathematical relationship between the distance the planet from the Sun and the speed it is moving around the sun. Both of these are consequences of the application of the law of gravity and Newton's law of conservation since the pulse object, moving on an elliptic trajectory, but "Astrology surprisingly was able to get them without any of these notions!"

But the essence of and those quantitative steps in any items after math processing may result in an important opening and for you. No same any items? This is Sachs [2] produced calculations in health-biological laboratory; you can take it in any other laboratory.

Figure 2: The planets in the solar system.

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Methodology

Dr. Mathews and Dr. Fink presented [3] resulted in an excellent example of the use of a regression line: "Applications of numerical techniques in science and engineering involve curve fitting of experimental data. For example, in 1601, the German astronomer Johannes Kepler formulated the third law of planetary motion, \( T^2 \propto x^{3/2} \), where \( x \) is the distance to the Sun, measured in millions of kilometers, \( T \) is the orbital period measured in days, and \( C \) is a constant. The observed data pairs \((x, T)\) for the first four planets, Mercury, Venus, Earth, and Mars, are \((58; 88), (108; 225), (150; 365), (228; 687)\), and the coefficient \( C \) obtained from the method of least squares is \( C = 0.199769 \). The curve \( T = 0.199769x^{3/2} \) and the data points are shown in Figure 3." 

The authors present a power adjustment: "Let us suppose that \( (x_k, y_k) \) for \( k = 1 \) to \( N \) Points with various abscissas.

\[
E(A) = \sum_{k=1}^{N} ( y_k - A x_k^M )^2 .
\]

Since we have only one variable as well – taking private derivatives is not required.

\[
E(A) = \sum_{k=1}^{N} x_k^2 \left[ a - A x_k^M - y_k \right] . \\
\text{Hence the factor a curve, built least-squares (Table 1), } y = A x_k^M. \\
\text{Equal to}
\]

\[
\sum_{k=1}^{N} x_k^M y_k . \\
A = \frac{\sum_{k=1}^{N} x_k^2}{\sum_{k=1}^{N} x_k^M} .
\]

\[ (1) \]

Source: John [3].

Figure 3: The least squares fit \( T = 0.199769x^{3/2} \) for the first four planets, using Mr. Kepler’s third law of planetary motion.

\[ x \quad y \quad x^{3/2} \quad (x^{3/2})^y \quad x^{(2*(3/2))} \]

| 58  | 88  | 441,7148 | 38870,906  | 195112 |
| 108 | 225 | 1122,369  | 252533,01  | 1259712 |
| 150 | 365 | 1837,117  | 670547,82  | 3375000 |
| 228 | 687 | 3442,725  | 2365151,7  | 11852352 |

Table 1: The original data for the coefficient as well.

Source: Sachs [2].

Table 2: Normal equations for the most important functional equations.

<table>
<thead>
<tr>
<th>Functional equations</th>
<th>Normal equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y = ax + b )</td>
<td>( y = ax + b )</td>
</tr>
<tr>
<td>( y = ax + bx )</td>
<td>( y = ax + bx )</td>
</tr>
<tr>
<td>( y = ax + bx )</td>
<td>( y = ax + bx )</td>
</tr>
<tr>
<td>( y = ax + bx + c \times x^2 )</td>
<td>( y = ax + bx + c \times x^2 )</td>
</tr>
<tr>
<td>( y = a \times b \times x \times x^2 )</td>
<td>( y = a \times b \times x \times x^2 )</td>
</tr>
</tbody>
</table>

Source: Sachs [2].

3327103,5/16682176=0,199440616.

In the case described is only a «A» factor, factor «M» is already known. It saves time, when a «A» – already known physical, a constant. But we are interested in, as well as received and the factor «M» and the factor «A». And here comes the assistance table ready normal equations (Table 2) for the most important functional equations of the 42-year-old books on health care and biological statistics, written L. Decided by Dr. Lothar Sachs, which does not become obsolete! Supplement table reduction will affect: (Table 3)

Logarithms on different grounds are mutually go at each other.

\[ \log_{10} x = \log_{10} c \times \ln_c x = \log_{10} 2.71828182845904 \times \ln_c x \approx 0.434294482 \times \ln_c x; \]
\[ 4.060443^x \times 4.34294482 = 1.763427989; \]
\[ \ln_c x = \ln_{10} x \times \log_{10} 30258093 \times \log_{10} x; \]
\[ 1.763428^2 \times 302585 = 4.060443025; \]
Logarithm to base 2 - \( \log_2 \) (binär):

\[
\log_2 1 = 0, \quad \log_2 3,321928 = 1,763428 \times 3,321928 = 5,857981017;
\]

\[
\exp(-1,763428) = 0,199683412.
\]

Using differentiation will show you how the system of equations is shown.

Equations systems of the selection can be solved by Gaussian elimination, the decomposition of the triangular matrix or matrix, but saving a place, we will use the calculator equations: answer:

\[
\text{Table 3: Supplement to Table 2.}
\]

\[
\begin{array}{ccc}
X & y & \text{ln} x \times \text{ln} y \times (\text{ln} x)^2 \times (\text{ln} y)^2 \\
58 & 88 & 4,060443, 4,477337, 16,4872, 18,17997 \\
108 & 225 & 4,682131, 5,4161, 21,92235, 25,35889 \\
150 & 365 & 5,010635, 5,898987, 25,10646, 29,56223 \\
228 & 687 & 5,429346, 6,532334, 29,4778, 35,4663 \\
\end{array}
\]

\[
\text{Table 4: The first option baseline data for the coefficients under normal equations.}
\]

\[
\begin{array}{cccc}
X & y & \text{ln} x \times \text{ln} y \times (\text{ln} x)^2 \times (\text{ln} y)^2 \\
58 & 88 & 4,060443, 4,477337, 16,4872, 18,17997 \\
108 & 225 & 4,682131, 5,4161, 21,92235, 25,35889 \\
150 & 365 & 5,010635, 5,898987, 25,10646, 29,56223 \\
228 & 687 & 5,429346, 6,532334, 29,4778, 35,4663 \\
\end{array}
\]

The first option baseline data for the coefficients under normal equations.

We can also use the MATLAB program:

\[
\text{format long} \\
A=[4.000000, 8.330878; 8.330878, 17.539720]; \\
\text{det(A)} \\
X=inv(A)*[9.695915, 20.477080]' \\
\text{B=A*X} \\
\text{ans =} \\
\text{0.19972412} \\
4a + 8,330878b = 9,695915; \\
8,330878a + 17,539720b = 20,47708.
\]

We use the calculator equations: answer: Orner: \( a = -132105258110/188837937279 = -0,699569483, \)

\( b = 56641751835/37767857458 = 1,499745037; \)

\(10^{-0,699569483} \approx 0,19972412. \)

Now hold a fixed and differentiate \( E(a, b) \) with respect \( b \), and get

\[
\text{Table 5: The second option baseline data for the coefficients under normal equations.}
\]

\[
\begin{array}{cccc}
\text{lgx} & \text{lgy} & \text{lg(x^2)} & \text{lgx*ly} \\
1,763428 & 1,944483 & 3,109678 & 3,428955 \\
2,033424 & 2,352183 & 4,134812 & 4,782984 \\
2,176091 & 2,562293 & 4,735373 & 5,575783 \\
2,357935 & 2,836967 & 5,559857 & 6,689359 \\
\end{array}
\]
Since $106513,2 \geq 18,51282051$ and $9,39E-06 \leq 0,05$, с 95% reliability zero hypothesis is rejected. And further, since $326,3635 \geq 4,30265273$, and $9,39E-06 \leq 0,05$, the zero hypothesis is rejected (Figure 4).

Homoscedasticity has not been identified.

The model will take a view:

\[
\begin{align*}
\ln(x) & = 1.499748 \\
\ln(y) & = -1.61083 + b_1 \ln(x) + b_2 \ln(x) y
\end{align*}
\]

Next will be processing the same sample using the program Microsoft Office Excel, the creature some of its performance indicators we will look at below. The other indicators is well described in the 1 (Tables 7 and 8).

<table>
<thead>
<tr>
<th>Table 6: The third option baseline data for the coefficients under normal equations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\log_2(x)$</td>
</tr>
<tr>
<td>5.857981</td>
</tr>
<tr>
<td>6.754888</td>
</tr>
<tr>
<td>7.228819</td>
</tr>
<tr>
<td>7.832889</td>
</tr>
</tbody>
</table>

The outcome of the withdraw

Regression statistics

| Multiple R | 0.999991 |
| R-square | 0.999981 |
| Normalized R-square | 0.999972 |
| Standard error | 0.004598 |

Variance analysis

<table>
<thead>
<tr>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>The significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression models</td>
<td>1</td>
<td>2.251954</td>
<td>2.251954</td>
<td>106513,2</td>
</tr>
<tr>
<td>The Balance</td>
<td>2</td>
<td>4.23 E-05</td>
<td>2.11 E-05</td>
<td>106513</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>2.251996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y-intersection</td>
<td>-1.61083</td>
<td>0.022157</td>
<td>-72.7004</td>
<td>0.000189</td>
</tr>
<tr>
<td>ln(x)</td>
<td>1.499748</td>
<td>0.004595</td>
<td>326.3635</td>
<td>9.39 E-06</td>
</tr>
</tbody>
</table>

The balance

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Predicted ln(y)</th>
<th>The residue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.478809</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.411184</td>
<td>-0.00147</td>
</tr>
<tr>
<td>3</td>
<td>5.903859</td>
<td>0.004916</td>
</tr>
<tr>
<td>4</td>
<td>6.531818</td>
<td>-0.00396</td>
</tr>
</tbody>
</table>

Table 7: Summary regression analysis depending on period completing the first four planets, which used Mr. Kepler, on the distance to the Sun (exponential model), which was established by using the Microsoft Office Excel 2007.

Table 8: The limit values F and t-statistic.

<table>
<thead>
<tr>
<th>One-Tail F-Test</th>
<th>Critical Value</th>
<th>18,51282051</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Tail Test</td>
<td>Lower Critical Value</td>
<td>-4.30265273</td>
</tr>
<tr>
<td></td>
<td>Upper Critical Value</td>
<td>4.30265273</td>
</tr>
</tbody>
</table>

Figure 4: The Schedule balances.
Heteroscedasticity in Figure 5 and Table 11. Since $437091.8 \geq 18.51282051$ and $2,29E-06 \leq 0.05$, with $95\%$ reliability zero hypothesis is rejected. And further, since $661,1292 \geq 4,30265273$, and $2,29E-06 \leq 0.05$, the zero hypothesis is rejected.

So, as expected, more than was possible Kepler’s exact formula:

$$\exp(-1.58024) = 0.20592567.$$  

We will do the job “b” (Figure 6, Tables 12 and 13).

Since $9801780 \geq 5,591447848$ and $8,96E-23 \leq 0.05$, with $95\%$ reliability zero hypothesis is rejected. And further, since $3130.779 \geq 2,364624251$, and $8,96E-23 \leq 0.05$, the zero hypothesis is rejected (Figure 7).

Since there is a definite homoscedasticity, conclusions call for caution.

So, the most accurate formula, which we have been able to calculate:

$$\exp(-1.603165) = 0.201258526;$$  

The outcome of the withdrawl

<table>
<thead>
<tr>
<th>Planet</th>
<th>Distance from Sun (km * 10^6)</th>
<th>Sidereal period (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>57.59</td>
<td>87.99</td>
</tr>
<tr>
<td>Venus</td>
<td>108.11</td>
<td>224.7</td>
</tr>
<tr>
<td>Earth</td>
<td>149.57</td>
<td>365.26</td>
</tr>
<tr>
<td>Mars</td>
<td>227.84</td>
<td>686.98</td>
</tr>
<tr>
<td>Jupiter</td>
<td>778.14</td>
<td>4332.4</td>
</tr>
<tr>
<td>Saturn</td>
<td>1427</td>
<td>10759</td>
</tr>
<tr>
<td>Uranium</td>
<td>2870.3</td>
<td>30684</td>
</tr>
<tr>
<td>Neptune</td>
<td>4499.9</td>
<td>60188</td>
</tr>
<tr>
<td>Pluto</td>
<td>5909</td>
<td>90710</td>
</tr>
</tbody>
</table>

Source: John and Kurtis [3].

Table 9: The distance nine planets from the Sun and their star period in days.

<table>
<thead>
<tr>
<th>Y-intersection</th>
<th>Standard error</th>
<th>T-statistics</th>
<th>P-value</th>
<th>The lower 95%</th>
<th>The upper 95%</th>
<th>The lower 95.0 %</th>
<th>The upper 95.0 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>-158.024</td>
<td>0.010882</td>
<td>-145.09</td>
<td>4.75 E-05</td>
<td>-162,711</td>
<td>-153,338</td>
<td>-162,711</td>
<td>-153,338</td>
</tr>
<tr>
<td>ln(x)</td>
<td>1.494081</td>
<td>0.00226</td>
<td>661.1292</td>
<td>2.29 E-06</td>
<td>1.484358</td>
<td>1.503805</td>
<td>1.503805</td>
</tr>
</tbody>
</table>

Table 10: Summary regression analysis depending on the period completing the first four planets, which used Dr. Mathews and Dr. Fink, on the distance to the Sun (exponential model), which was established by using the program Microsoft Office Excel 2007.

The F - statistics with 1 and 7 degrees of freedom and largest errors $\alpha = 0.0000000000000000000896\times10^{-9}$ as well 9801780, with $0.9999999999999999$ reliability of the null hypothesis is rejected. On
The outcome of the withdraw

Table 11: The limit values F and t-statistic.

<table>
<thead>
<tr>
<th>Statistical Test</th>
<th>Critical Value</th>
<th>Lower Critical Value</th>
<th>Upper Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Tail F-Test</td>
<td>18.51282051</td>
<td>-4.30265273</td>
<td>4.30265273</td>
</tr>
<tr>
<td>Two-Tail Test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regression statistics

- Multiple R: 0.9999996
- R-square: 0.9999993
- Normalized R-square: 0.9999992
- Standard error: 0.0023366
- Monitoring: 9

Variance analysis

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>The significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression models.</td>
<td>1</td>
<td>53.51453</td>
<td>53.51453</td>
<td>9801780</td>
</tr>
<tr>
<td>The Balance</td>
<td>7</td>
<td>3.82E-05</td>
<td>5.46E-06</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>53.51457</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12: Summary regression depending on the completion of all 9 planets in orbit on the distance to the Sun (exponential model), with the use of modern data, created by using the program Microsoft Office Excel 2007.

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Predicted ln(y)</th>
<th>The residue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.4723886</td>
<td>0.004835</td>
</tr>
<tr>
<td>2</td>
<td>5.4163946</td>
<td>-0.00163</td>
</tr>
<tr>
<td>3</td>
<td>5.9029596</td>
<td>-0.00235</td>
</tr>
<tr>
<td>4</td>
<td>6.5338142</td>
<td>-0.00151</td>
</tr>
<tr>
<td>5</td>
<td>8.3748542</td>
<td>-0.00098</td>
</tr>
<tr>
<td>6</td>
<td>9.2838202</td>
<td>-0.00032</td>
</tr>
<tr>
<td>7</td>
<td>10.331313</td>
<td>0.000184</td>
</tr>
<tr>
<td>8</td>
<td>11.005276</td>
<td>-4.70E-05</td>
</tr>
<tr>
<td>9</td>
<td>11.413607</td>
<td>0.001816</td>
</tr>
</tbody>
</table>

Figure 6: The least-squares fit $T = 0.201258526 + 1.4988974 \ln(x)$ for the all nine planets, using Mr. Mathews and Mr. Fink third law of planetary motion.

Figure 7: The Schedule balances.

Figure 8: The first 1000 digits to the right of the decimal point in the number of $e$.

Table 13: The limit values F and t-statistic.

<table>
<thead>
<tr>
<th>Statistical Test</th>
<th>Critical Value</th>
<th>Lower Critical Value</th>
<th>Upper Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-Tail F-Test</td>
<td>5.591447848</td>
<td>-2.364624251</td>
<td>2.364624251</td>
</tr>
<tr>
<td>Two-Tail Test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: https://en.wikipedia.org/wiki/E_(mathematical_constant) [5].

1,11607E + 24 attempts to account for 1 failure. And if we use the first 1000 digits to the right of the decimal point in the number of $e$ (Figure 8), the majority of which the program Microsoft Office Excel does not use, by allowing, as writes Mathews rounding error (3, C. 39), you can speak to the good prospects for success in planetary flights.

The third law isochronism (9): "The squares periods of planets..."
around the Sun are, as well as Cuba large spindles orbits planets. It is true not only for planetary exploration, but also for their satellites.\[ \frac{T^2}{a^3} = \text{const}; \quad (2) \]

Where \( T \) - Periods of planets around the Sun, as well as well - the length large spindles their orbits.

So, the formula the third act with increasing accuracy.\[ T = 0.199721776 \times 1.499748; \]
\[ T = 0.205925674 \times 1.494081; \]
\[ T = 0.201258526 \times 1.4988974. \]

Make the conversion, having the formula (2):
\[ T = 0.201258526 \times 1.4988974 - 0.201258526 \times \sqrt{1.499748}; \]
\[ T^2 = (0.201258526 \times \sqrt{1.499748})^2 = 0.040504994 \times 1.499748; \]
\[ T^2 = 0.040504994. \]

We have an obligation to consider and competing option.\[ T = 0.201258526 \times 1.4988974 - 0.201258526 \times \sqrt{1.494081}; \]
\[ T^2 = (0.201258526 \times \sqrt{1.494081})^2 = 0.040409572 \times 1.4988974; \]
\[ T^2 = 0.040409572. \]

Dr. Mathews and Dr. Fink [3] notes that: "In the practice of numerical analysis it is important to be aware that computed solutions are not exact mathematical solutions. The precision of a numerical solution can be diminished in several subtle ways. Understanding these difficulties can often guide the practitioner in the proper implementation and/or development of numerical algorithms (3, C. 37-38)".

Find absolute and relative error:
\[ E_x = |x - \lambda| = 3 - 2.9977948 = 0.0022052; \]
\[ R_x = \frac{|x - \lambda|}{x} = \frac{3 - 2.9977948}{3} = 0.000735067. \]

So, numerically error, not overwhelming. But, as pointed out Dr. Mathews and Dr. Fink [3]: "Error may spread in the follow-up calculations". Next, we can completely eliminate this error, by using formula (1), but for this we will need to pay a distortion factor «\( \lambda \)>>.

e-called Euler’s number after the Swiss mathematician Leonhard Euler, e is not to be confused with \( \gamma \), the Euler–Mascheroni constant, sometimes called simply Euler’s constant. The number e is also known as Napier’s constant, but Euler’s choice of the symbol e is said to have been retained in his honor. The constant was discovered by the Swiss mathematician Jacob Bernoulli while studying compound interest (8).

Natural logarithms (ln) as grounds have a constant
\[ e = 2.718281 \text{ (limit number } e = 1 + \frac{1}{1} + \frac{1}{1 \times 2} + \frac{1}{1 \times 2 \times 3} + \frac{1}{1 \times 2 \times 3 \times 4} + ... = 2.718333333. \]

What means 99.99 999 999 999 999 999 999 104% reliability? This means that when throwing coins seventy threefold in a row the emblem is still permitted as likely, while seventy fourfold has already been considered as a ‘over random’. By the theorem of probability for independent events the probability equal to:

\[ P_{4x} = \left( \frac{1}{2} \right)^4 = 0.06250; 0.05; \]
\[ P_{3x} = \left( \frac{1}{2} \right)^5 = 0.03125; 0.05; \]
\[ P_{6x} = \left( \frac{1}{2} \right)^6 = 0.00015288; 9.39 \times 10^{-6}; \]
\[ P_{17x} = \left( \frac{1}{2} \right)^{17} = 0.00000762939; 9.39 \times 10^{-6}; \]
\[ P_{8x} = \left( \frac{1}{2} \right)^{18} = 3.8147 \times 10^{-6}; 2.29 \times 10^{-6}; \]
\[ P_{9x} = \left( \frac{1}{2} \right)^{19} = 1.90735 \times 10^{-6}; 2.29 \times 10^{-6}; \]
\[ P_{3x} = \left( \frac{1}{2} \right)^{73} = 1.05879 \times 10^{-22}; 8.96 \times 10^{-23}; \]
\[ P_{4x} = \left( \frac{1}{2} \right)^{74} = 5.29396 \times 10^{-23}; (8.96 \times 10^{-23}). \]

I.e. approximately 0.105879E-20% and 0.529396E-21%. So, the statistical reliability 99.99 999 999 999 999 999 999 104% means that accidental emergence circumstances equally incredible, as well as and the event, consisting of the landing emblem in a row 74 times. The likelihood that, when n-purchasable throwing coins each time will fall emblem, is equal (1/2)\(^n\). And is listed in the following table. This is well stated in the 2\(^n\) (Tables 14 and 15).

### Table 14: The probability \( P \) that when n-purchasable throwing coins each time it falls out emblem, is equal (1/2)\(^n\).

<table>
<thead>
<tr>
<th>( n )</th>
<th>( 2^n )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>0.25</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>0.125</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>0.0625</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>0.03125</td>
</tr>
<tr>
<td>6</td>
<td>64</td>
<td>0.01562</td>
</tr>
<tr>
<td>7</td>
<td>128</td>
<td>0.00781</td>
</tr>
<tr>
<td>8</td>
<td>256</td>
<td>0.00391</td>
</tr>
<tr>
<td>9</td>
<td>512</td>
<td>0.00195</td>
</tr>
<tr>
<td>10</td>
<td>1024</td>
<td>0.00098</td>
</tr>
<tr>
<td>11</td>
<td>2048</td>
<td>0.00049</td>
</tr>
<tr>
<td>12</td>
<td>4096</td>
<td>0.00024</td>
</tr>
<tr>
<td>13</td>
<td>8192</td>
<td>0.00012</td>
</tr>
<tr>
<td>14</td>
<td>16384</td>
<td>0.00006</td>
</tr>
<tr>
<td>15</td>
<td>32768</td>
<td>0.00003</td>
</tr>
</tbody>
</table>

### Table 15: Supplement to Table 14.
And here we can show how important it is knowledge binary logarithm:

\[ \log_2 0.00000762939 = -17. \]

Dr. Lothar Sachs points out "If we choose a factor in this, saying that the 95% is the correct and only in 5% wrong, we say: with the statistical reliability S in 95% confidence interval a custom statistics includes the parameter general population". In summary, you want to say: we have 5% -s chances to reject a valid factor equation and the 95% - s - to take is also a valid factor [5-8].

### Interpolation Probabilities

This method computational complexity (2, with 152) The value of F-test for \( v_1 \) and \( v_2 \). Degrees of Freedom offered. What is it for? In special cases, above all, when target is dangerous to human life, it is necessary to take smaller, than \( \alpha=0.001 \) errors. Thus, for example, in the manufacture of vaccines required limit constant anti-serum. Not in fallible measurements must be detected and eliminated. Dr. Sachs notes that: "An unreasonable decision null-hypothesis "anti-serum is correct" means a dangerous error" (2, C. 114). Null-hypothesis - the hypothesis that the two together, the issues from the point of view of one or more signs, are identical, i.e., the actual difference is equal to zero, and the found from experience unlike the zero is random in nature. The average of the \( \mu \). The general aggregate, evaluated on the basis random sampling, is not different from the desired values \( \mu_0 \). And further Sachs writes that science makes a cell network, all less than in order to continuously extend and check all the new hypotheses, the most accurate and the most credibly explaining this world. Gamma the findings and conclusions will never be totally reliable, but they are engaged in the preliminary hypotheses go all the more general and strict theories, a thorough test, have led to a better understanding and peace paradigm (2, C. 112). A summary table value \( F=106513,2 \), \( 437091,8 \) and \( 9801780 \). Figures 10-16 using the standard normal probability calculator. Since in the following table we have \( t=326.3635 \), then get \( t=326.3635 \), \( 331,66 > 326,3635 > 331,66 \) (Figure 9).

\[ P = \alpha \times m^k = 0,00000909091 \times 1047619048 = 0,00000939053. \]

We will determine the number of standard deviations for the \( S = 90% \). So: \( P=0.1/2=0.05, z=1.56 \).

Since in the following table we have \( t=326.3635 \), then get confirmation: -331.66 > 326,3635 > 331,66 (Figure 9).

Figures 10-16 using the standard normal probability calculator identified.

Standard deviation: We will determine the arbitrary empirical F-test (2, P. 152), and in particular for values with a \( P=0.1 \), an attacker who successfully exploited this an approximation, the proposed [9,10], which is true for the number of degrees of freedom, not less than three (the greater number of degrees of freedom, the better approximation), and meaningful probability is defined as the area, the corresponding z-the limits on both ends of normal distribution. In Tables 7, 10 and 12 freedom, equal to 106513,2, 437091,8 \( \approx 9801780 \).
Figure 9: Interactive Builder standard normal probability plots.

Figure 10: Standard normal probability Calculator [11].

Figure 11: Standard normal probability Calculator.

Figure 12: Standard normal probability Calculator.

Figure 13: Standard normal probability Calculator.

\[ z = \frac{(1 + \frac{2}{9 \times 2})}{1 - \frac{2}{9 \times 2}} - \frac{2}{9 \times 2} \]

\[ z = \frac{106513,1^{1/3}}{2} - \frac{1}{9 \times 2} \]

\[ z = \frac{437091,6^{2/3}}{2} + \frac{2}{9 \times 2} \]
\( \mu \pm 1,96 \sigma, \text{or } z = \pm 1,96 \) for 95% whole area
\( (P = 0,025; 0,025 \times 2 = 0,05; 1 - 0,05 = 0,95) \) and

\( \mu \pm 3 \sigma, \text{or } z = \pm 3 \) for 99.73% whole area
\( (P = 0,0013; 0,0013 \times 2 = 0,0026; 1 - 0,0026 = 0,9974) \) and

\( \mu \pm 5,769823 \sigma, \text{or } z = \pm 5,769823 \) covered at least 99,99999192% whole area
\( (0,0000000039 \times 2 = 0,0000000078; 1 - 0,0000000078 = 0,9999999922). \)

Since \( z = 5,769823 \), likelihood of errors \( \alpha = z \times 2 = 0,000000039 \times 2 = 0,0000000078 \) hence the statistical reliability \( S = 1 - \)

\( z = \frac{1}{ \sqrt{2} } \times 9801780^{\frac{2}{3}} \times (1 - \frac{2}{9 \times 1}) = 5,769823. \)

Now it remains to substitute the values found in Table 17. The probabilities are respectively equal to 0,00052 and 0,00048. Substitution in java normal probability calculator (Figure 16) provides answers 0,005 141 833, 0,004 799 659 and 0,000 000 039.

On the Figure 17 area under the curve normal distribution from \( z \) to \( \infty \) probability that the variable \( Z \) will take the value \( \geq z P < 0,000 000 039. \) Since:

\begin{align*}
\text{Figure 14: Standard normal probability Calculator.} \\
\text{Figure 15: Standard normal probability Calculator.} \\
\text{Figure 16: Standard normal probability Calculator.} \\
\text{Figure 17: Java Normal Probability Calculator high Power.} \\
\text{Figure 18: The window (15) shader graph normal distribution for 99.999999992% reliability.}
\end{align*}
Find \( F \) for:

1. \( F \frac{12}{1} \frac{1}{2}; 0,95 \),
2. \( F \frac{12}{1} \frac{1}{2}; 0,05, 199,5 \)

Citation:

lack of power sleep, as it was in Abkhazia.

Data manually is still necessary because of the computer crashes, the Excel provides the answer \( F = 0,005012531 \). A method of getting the search value equal to 1/199.5 = 0.00501. The program Microsoft Office

Define for the condition above (Figure 18).

0.0 000 000 078 = 0.999 999 922 (Draw 18.). Confirmed waiting, that

Source:

Source: http://www.psychstat.missouristate.edu/introbook/sbk00.htm [10].

Table 17: Standard Normal Probabilities: (The table is based on the area \( P \) under the standard normal probability curve, below the respective \( z \)-statistic).

For a ratio of 1 to easily calculate the \( F \left( \frac{12}{1} \right) \frac{1}{2} \). (1)

Let's take a look at link \( F \) and 1/\( F \) and \( \nu_1, \nu_2 \) (Calc. 150):

\[
F(1; 0.95) = \frac{1}{F(2; 0.95)}.
\]

Conclusion

In conclusion, it should be noted that the reliability S=99,999 061%, obtained for legacy Kepler equation even today sounds, because the default is used S=95%. Starting rocket to Mars, you will receive the error a=9,39E-04% - the missiles will not be different, but good will. Why is the same not excellent? Mathews is responsible (3, C. 49-50): "many real data contain uncertainty or error. This error type is treated as noise. It affects the accuracy for any numerical calculations, which are data. Improving the accuracy is not achieved when successful calculations, using noisy data."

Submitted by Dr. Mathews source, as expected, in the job "a" have greatly reduced error; in the job "b" error on the merits has no

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disappeared. But the relationship has become less stochastic and more functional [11].

Dr. Uotshem and Dr. Parramou [12] say that the new literature and new methods for applying quantitative techniques, previously used only in physics, at the same time, regurgitation and adapting technology quantitative analysis to the economy. But many economists should be ready to be done and the return path is to raise agriculture and to rebuild factories.

It will be recalled that, and nonlinear models are acceptable for the calculations in the economy. This is difficult, but Russians traveling medicine in Germany and the "MAZ" do not equal "Mercedes" largely on errors in the calculations.

References