

**APPROXIMATION OF THE LINE OF VARIATION OF THE TENSION OF RAW
SILK WRAPPED ON A WIND BASED ON REWINDING INDICATORS**

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Abstract: *In the article, the approximation of the line of variation of the tension of the thread wound on the wheel according to the indicators of rewinding Empirical regression equation, significance level of regression equations , correlation between variables and During the re-winding process, the rings on the raw silk re-winding wheel were analyzed.*

Key word: *Raw silk, amount of interruptions, regression equations, wheel, spool.*

In our republic, special attention is being paid to the rapid development of the production of finished products with high added value based on deep processing of natural silk raw materials. In the new development strategy of Uzbekistan for 2022-2026, by ensuring stable high growth rates in economic sectors, increasing per capita income by 2030 and production of textile industry products increasing its size by 2 barabar is defined as one of the most important tasks. In solving these tasks, including improving the method of preserving the technological properties of the cocoon shell and introduction to production is important.

The following data are required to construct the regression equation. a) Create an empirical regression equation; b) $\alpha = 0,05$ Estimate the level of significance of the regression equation; c) Estimate the degree of association between variables using the empirical correlation coefficient determination correlation R. It is reasonable to assume the following non-linear equation for correlation coupling:

$$y_x = b_0 + b_1x + b_2x^2 \quad (1)$$

, b_1 , and coefficients b_2 in the equation b_0 are determined by the method of having the smallest value of the square deviation. That's it according to the following

functional $S = \sum_{i=1}^n (y_i - y_x)^2 = \sum_{i=1}^n (y_i - b_0 - b_1x_i - b_2x_i^2)$ the to a minimum reach



conditions $\frac{\partial S}{\partial b_0} = 0, \frac{\partial S}{\partial b_1} = 0, \frac{\partial S}{\partial b_2} = 0$ from using $b_0, b_1,$ and b_2 coefficients to find for equations system we get :

$$\begin{aligned} b_0 n + b_1 S_1 + b_2 S_2 &= Z_1 \\ b_0 S_1 + b_1 S_2 + b_2 S_3 &= Z_2 \\ b_0 S_2 + b_1 S_3 + b_2 S_4 &= Z_3 \end{aligned} \quad (2)$$

Here : _

$$S_1 = \sum_{i=1}^n x_i, S_2 = \sum_{i=1}^n x_i^2, S_3 = \sum_{i=1}^n x_i, S_4 = \sum_{i=1}^n x_i^2, Z_1 = \sum_{i=1}^n y_i, Z_2 = \sum_{i=1}^n x_i y_i, Z_3 = \sum_{i=1}^n x_i^2 y_i$$

We evaluate the importance of the obtained connection based on the recommendations of works [1,2]. We determine the value of this statistic and

$$F = \frac{s_R^2}{s_e^2} = \frac{Q_R(n-m)}{Q_e(m-1)}$$
 compare it with the Fisher-Snedekor criterion $F_{\alpha; k_1; k_2}$.

Here: n - the number of observations, m - the number of parameters to be evaluated in the regression equation for a quadratic function $m = 3$

$$Q = \sum_{i=1}^n (y_i - \bar{y})^2, Q_e = \sum_{i=1}^{10} (y_{x_i} - y_i)^2, Q_R = Q - Q_e$$

where: y_i ($i = 1..10$)-experts' average rating (ballad), $\bar{y} = \frac{\sum_{i=1}^{10} y_i}{n} = \frac{Z_1}{n}$ - their arithmetic mean value, y_{x_i} - (2) $x = x_i$ values of connection:

$$y_{x_i} = y_x(x_i) \quad \alpha = 0,05 \quad k_1 = m - 1, \quad k_2 = n - m$$

Next stage $F = \frac{s_R^2}{s_e^2} = \frac{Q_R(n-m)}{Q_e(m-1)}$ the value of the statistic is compared with the

value n of the Fisher-Snedekor criterion in the table F_{α, k_1, k_2} .

If $F > F_{0.05; 2; 7}$ inequality if fulfilled, to the criterion according to regression equation appropriate will be, etc without above regression connection there is it won't happen. This from the formula density coefficient is determined. $R_{yx} = R = \sqrt{1 - Q_e / Q}$ and this quantity is called the coefficient of determination. If the coefficient varies in these ranges $0 < R < 0,5$, $0,5 < R < 0,8$, $0,8 < R < 1$, it indicates the low, medium, and high degree of association, respectively.

The above-mentioned regression analysis method was used to mathematically process the number of rings in processed and unprocessed cocoons per unit of time in the table. We use the following values given in the table : 2,2,2,4,4,4,5,5,3,3,1,3.

Table 1



Time, min	Hanger , ta	Rings, unworked	Rings, machined
t ₁ 5	40	12	2
t ₂ 10	40	12	2
t ₃ 15	40	10	2
t ₄ 20	40	11	4
t ₅ 25	40	11	4
t ₆ 30	40	10	4
t ₇ 35	40	10	5
t ₈ 40	40	10	5
t ₉ 45	40	9	3
t ₁₀ 50	40	8	3
t ₁₁ 55	40	9	1
t ₁₂ 60	40	8	3
Average	40	10.0	3.0

Table to the results according to the following graph drawing we can

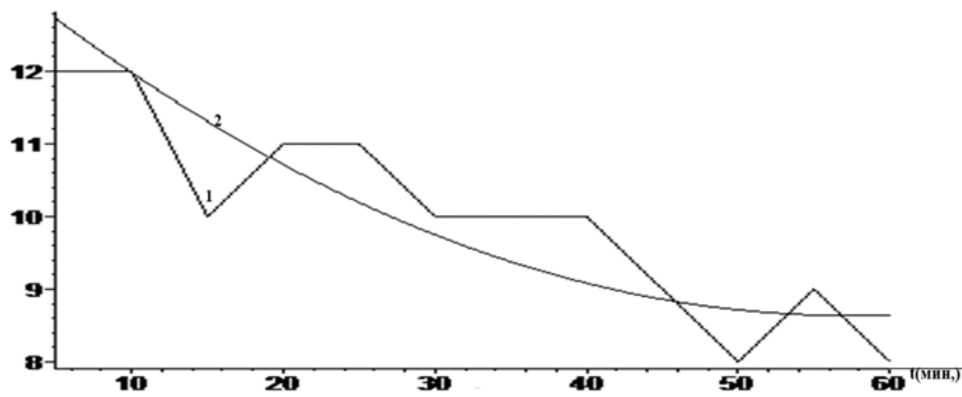


Figure 1. Processing not given interruptions number time according to change of the line approximation (Experiment 1, approximation 2) (available). Quoted graph approximation as follows will be

$$y = 13.54545455 - 1715284715x + 001498501499x^2$$

$F = 12.33925230$ $F_c(05,2,9) = 4.46$, $F > F_c$ Fischer - Snedekor criterion in progress.

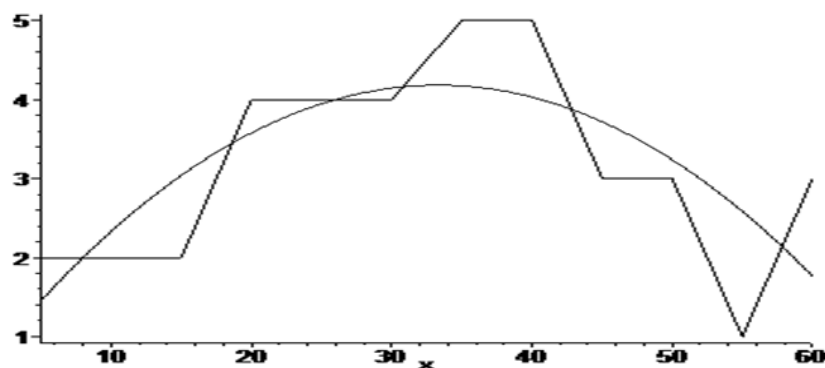


Figure 2. Processing when given interruptions number time according to change of the line approximation (Experiment 1 , approximation 2) (proposal).

Graph lines with the following formula is approximated .

$$y = 4090909091 + 2263736264x + 003396603397x^2$$

$F_c(05, 2, 9) = 4.46, F = 5.523869510 \quad F > F_c$ Fischer - Snedekor criterion in progress .

Received results that's it shows that processing to give through interruptions the number reduce can.

Cocoon to suck in enterprises It is known that six edged from the wheels is used . Cocoon to suck in the process , if the speed is 1.36 -2 m/s of yarn tension 7-10 cN organize does. Thread from drying after this tension 25-30 cN to reach , such tension raw silk to quality negative effect does. In this case , 2.33 text raw silk to the wheel when settling dry tension increase his to stretch effect does. So , next to the package again in wrapping raw of silk until the break stretching initial to tension depends will be How much he big if yarn dry with it increased goes _ As a result not only in interruption of stretching decrease at the expense of of yarn decay , even in the spool of yarn gluing increased goes.

Research at work to the wheel spinning of yarn tension reel again in wrapping (glued spool) rings to the amount dependence was studied . Because raw silk next in processes again work for reel again wrapping is taken .

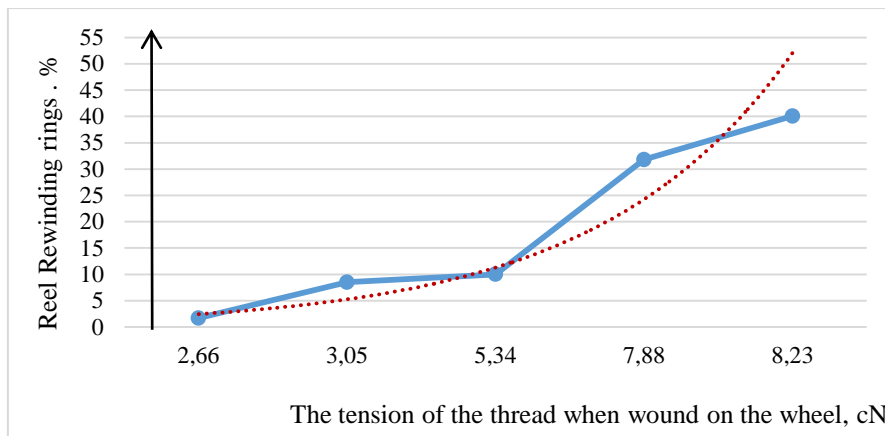
Table 2

Effect of thread tension on the number of rings in rewinding (glued bobbin)

o	The tension of the thread wound on the wheel , c N	Rings on the reel , %
	2.66	1.7
	3.05	8.5
	5.34	10.01
	7.88	31.8
	8.23	40.06

Received results that's it showed that to the wheel when wrapped of yarn tension increase reel again in wrapping rings the number gains it is of these indicators graph appearance and approximation as follows will be





Picture 3 . The tension of the thread that is wound on the wheel (y glued to the reel) spool) effect on the amount of rings

Here the most good tension 2 .66 cN the fact that was determined . Raw of silk again wrapping ability quality from the pointers one divide it into 10-20 spools and 10-20 spools again wrapping through is found . In this speed 130 ± 5 m/min again wrapping the time is defined as 90 min .

Table 3

Effect of thread tension on rewindability

o	The tension of the thread winding on the wheel, c N	Rewinding capacity, ring/kg
	2.66	14.5
	3.05	17.8
	5.34	37.3
	7.88	49,7
	8.23	89.5

This of indicators graph appearance and approximation as follows will be

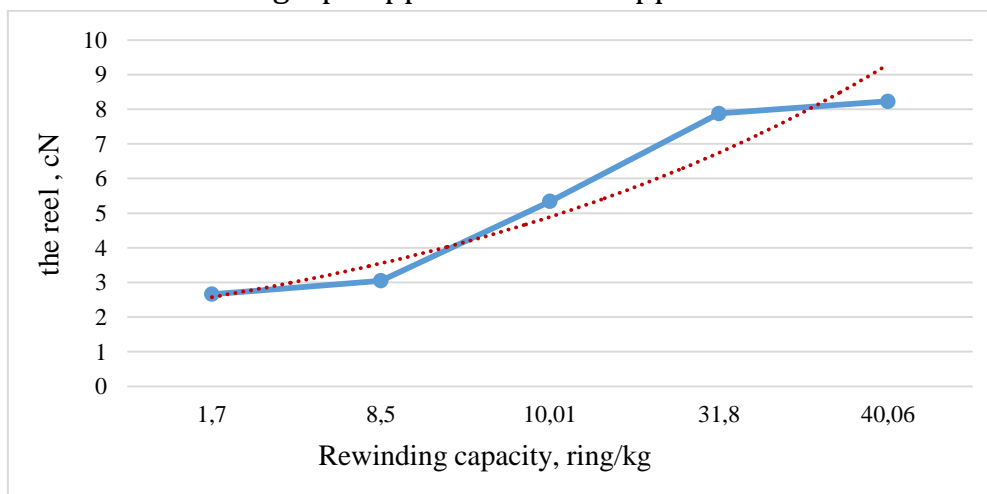


Figure 4. Charkhas in wrapping of yarn tension again wrapping ability dependence



Received the result that's it showed that to the wheel spinning of yarn tension is 2.66 cN from 8.23 cN up to change raw silk again wrapping capacity from 89.5 rings /kg to 14.5 rings /kg for 90 min at a speed of 130 m/min changed let's see can That is tension increase again wrapping ability deterioration take came.

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