1. *Methodological* specified by promy'shlennogo production tryhohrammы on byofabrykah. Vsesoyuznыy scientific - yssledovatelskyy Institute of Biology of plants protection methods: [approved the professor *NM Holыshyn*]. - M., 1983. - 76 p.
2. *Uncle MP* Fundamentals of biological plant protection method / [*Uncle MP, Padi MM Shelestov VS Degtyarev BG*]. - K .: Vintage, 1990. - 268 p.
3. *Sorokin AP* Effect of abiotic factors and issues a host on Operating Time preymahynalnoho development Rhoda species Trichogramma Westw. (Hymenoptera, Trichogrammatidae) / *AP Sorokin* // Byolohycheskye Individual protection of plants, s of application technology and manufacturing. St. Petersburg, 2005. - S. 148-155.
4. *Telenha NA* Guide to Application of reproduction and tryhohrammы to struggle with pests selskohozjajstvennyh cultures / *NA Telenha, VA Schepetylnykova*. - K .: Publishing House of the Academy of Sciences USSR, 1949. - 99 p.
5. *B. Dubrovin* Production of эntomolohycheskoho drug tryhohrammы / *B. Dubrovin, G. Golub, A. Maroussia* // Motrol. - Lublin, 2012. - Vol. 14, № 3. - P. 9-19.
6. *Meyer NF* Tryhohramma (Ecology and Results use in struggle with vrednыmy nasekomыmy) / *NF Meyer*. - M .: Gosudarstvennoye ultrasound-in kolhoznoy sovhoznoy and literature, 1941. - 175 p.
7. *Abashkyn AS* The results of tests of complex equipment for mehanyzyrovannoho rasselenyya tryhohrammы capsules / [*AS Abashkyn, Y.H Burykson, BB Kyku* et al.] // Tryhohramma (part 2): Sb. VNYYBMZR articles. - Chisinau "Shtyyntsa", 1980. - P. 43-46.
8. *Vorotыntseva AF* Avyatsyonnoe rasselenye tryhohrammы / [*AF Vorotыntseva, AK Pasko, A. Barabash* et al.] // Tryhohramma (part 2): Sb. VNYYBMZR articles. - Chisinau "Shtyyntsa", 1980. - P. 49-54.

In dannoy Article navedenы byotehnolohycheskyy production process and vnesenyya эntomolohycheskoho drug tryhohramы with the results of the effectiveness and definitions эkonomycheskoy okupaemosty equipment, kotoroe at this yspolzuetsya.

Byotehnolohycheskyy process эntomolohycheskyy drug tryhoramы, sebestoymost, Economic effectiveness.

In given paper are directed production and importation bioprocess entomological specimen trihogramme with outcomes of definition of economic efficiency and pay-back of equipment which is thus used.

Bioprocess, entomological specimen trihogramme, cost price, economic efficiency.

UDC 631.3.004

Review of stationary TERMS AND CHANGE OF ACCIDENTAL normality RESOURCE machine parameters

OV Sushko, Ph.D.
Taurian State Agrotechnical University

In the work the test conditions and normality stationary random process changes the basic resource parameters parts of machines to predict the residual life of the results of diagnosis.

Forecasting, resource parameters remaining life, statistical test, testing criteria.

Problem. Previous studies [1,2] found that the current method of predicting optimal

residual life determines the mean square error of at least 350-430 operating hours, resulting in higher average unit costs for repairs. It proved the need to build a more adequate description of the reality of the real process of change and development of diagnostic parameter on this basis more reliable and accurate method of determining the residual life of the machine component. We have developed a model of resource parameter changes depending on developments conditional distribution function of the residual life of the components of mobile technology and private method [3] proved the need for checks Conditions stationary random process and normality of parameters to ensure minimum quadratic error estimates of key indicators.

Analysis of recent research. It is proved that the existing method of the forecast-optimal dosing residual life causes large quadratic error, leading to higher average unit cost of repairs by 16% [2]. The model and obtained the conditional distribution function of the residual life of the components of mobile technology, which is consistent with Weibull distribution trohparametrychnym and allows you to find the probability of failure [3]. Comparison of the average residual life, defined according to their formula, with the corresponding actual values of diagnostic parameters showed a close match. Almost all values of average residual resources within the established experimental data confidence interval.

The purpose of research there is test conditions and stationary random process changes normality basic resource parameters parts of machines the developed method to ensure minimum quadratic error estimates of basic indicators prediction of residual life.

Results. More important condition for stationary random process is the dependence of the autocorrelation function only on the difference of arguments (the distance between the sections of the process) $\tau = t1 - t2$ [4]. Verify this condition on the basis of experimental data on the dynamics of the two diagnostic parameters - "The number of gases

that erupt in Carter" and "total angular backlash in the transmission MTZ-82." The number of implementations of both parameters (sample size) is *l1* = *l2* =10, the number of cross-sections of a random process *Z (t)* (Number of samples) of the first parameter *m1* = 13, the second parameter *m1* = 14. Matrix correlations of random processes *Z (t)* each parameter obtained by their standard statistical treatment [4]. The test carried out according to a standard private method [5].

1. From along the first (after the main) diagonal correlation matrix of each diagnostic parameter correlation coefficients *ρij* will form two groups with even and odd indices and summarized them in Table. 1.

2. Formula 3, [5] convert Fisher and found values *rij* Table is listed also. 1.

1. Correlation coefficients of stochastic process Z (t), which lie on a diagonal, and their transformation Fischer.

Diagnostic option	Group of correlation coefficients					
	with odd indices			with even indices		
	i, j	*ρij*	*rij*	*i, j*	*ρij*	*rij*
Number gases that erupt in diesel crankcase	1.2	.882	1,385	2.3	.859	1,290
	3.4	.926	1.627	4.5	.669	.808
	5.6	.900	1.473	6.7	.880	1.378
	7.8	.785	1.059	8.9	.765	1,007
	9.1	.819	1,155	10,11	.795	1,085
	11,12	8.895	1.449	12,13	.837	1,211
		$\sum r_{ij}$ = 8.148			$\sum r_{ij}$ = 6.779	
		$\sum r_{ij}^2$ = 11.290			$\sum r_{ij}^2$ = 7.874	
The total angular backlash in the transmission tractor	1.2	.938	1.722	2.3	.966	2.024
	3.4	.943	1,766	4.5	.977	2.227
	5.6	.949	2.251	6.7	.887	1,409
	7.8	.976	2,200	8.9	.954	1,876
	9.1	.754	.981	10,11	.559	.932
	11,12	.973	1,345	12,13	.937	1.712
	13,14	9,928	1.643			
		$\sum r_{ij}$ = 11.908			$\sum r_{ij}$ = 10,080	
		$\sum r_{ij}^2$ = 21.462			$\sum r_{ij}^2$ = 18.184	

3. Define the empirical criterion value *χ2* the formula 4, [5] and is listed in Table. 2.

2. Experimental and tabulated value of criterion χ2.

Diahnostych-tion parameter	Group correlation coefficients	Volume-you tags	The value of the criterion *χ2*	
			settlement	in brief at q = 0,05
1	2	3	4	5

Number of ha-mouth that pro-ryvayutsya in diesel crankcase	with odd indices	6	(10 - 3) (11.290 - $\frac{1{,}148^2}{6}$) = 1.58	11.1
	with even indices	6	(10 - 3) (7.874 - $\frac{6{,}779^2}{6}$) = 1.50	11.1

Extension Table. 2

1	2	3	4	5
The total angular backlash in the transmission tractor	with odd indices	7	(10 - 3) (21.462 - - $\frac{11{,}908^2}{7}$) = 8,43	12.6
	with even indices	6	(10 - 3) (18.184 - - $\frac{10{,}080^2}{6}$) = 8.75	11.1

As you can see, the two groups each diagnostic parameter empirical criterion value *χ2* significantly lower tabular value. That is, the experimental data do not contradict the hypothesis of homogeneity of correlation coefficients between sections of the process *Z (t)*Who are at the same distance from each other.

So important condition for stationary random process and can be done to figure out which component *Z (t)* random process parameter changes the property resource stationary. For 92% of the available resource parameter values χ^2 significantly less than the corresponding tabulated limits at a significance level *q* = 0.05 [6], ie the empirical data do not contradict the hypothesis of a stationary random process *z (t)*And the difference between the estimates should explain the statistical scattering.

Test the component description *Z (t)* of random-process parameter changes *u (t)* a normal random process used a more powerful test agreement *ω2*. Calculations carried out according to the instructions GOST 11.006-94. The calculation is made on the basis of experimental data on the dynamics of the diagnostic parameter "Height tread tires Slip", as the number of implementations of this parameter is large enough (*l* = 25). Matrix process values $\|Z_{ij}\|$ specified diagnostic parameters given in [7].

To simplify the calculations we choose some section of the process *Z (t)*That is a column matrix $\|Z_{ij}\|$ with close to zero mathematical eye-forging. Use the 1st column of the table, the corresponding value of the sample mean and mean square deviation up *mz* = 0.001; *σz*= 0.047. Normalized largest value *zij* written in the second column of Table 2. The

results of further calculations done by following [7], summarized in Table. 3. The total value placed in column 11 corresponds to 12.597.

3. The results of calculations by criteria ω^2.

№	x_i	$\frac{2j-1}{2l}$	$\Phi(x_i)$	ln (4)	(3) (5)	1 – (3)	1 – (4)	ln (8)	(7) (9)	(6)+ (10)
1	2	3	4	5	6	7	8	9	10	11
1	- 0,098	0,02	0,0186	-3,985	-0,0797	0,98	0,981	-0,019	-0,018	-0,098
2	- 0,058	0,06	0,1086	-2,220	-0,133	0,94	0,891	-0,115	-0,108	-0,241
3	- 0,053	0,10	0,1297	-2,043	-0,204	0,90	0,870	-0,139	-0,125	-0,329
4	- 0,045	0,14	0,1691	-1,777	-0,249	0,86	0,831	-0,185	-0,159	-0,408
5	- 0,041	0,18	0,1876	-1,673	-0,301	0,82	0,812	-0,208	-0,170	-0,471
6	- 0,038	0,22	0,2094	-1,564	-0,344	0,78	0,791	-0,235	-0,183	-0,527
7	- 0,030	0,26	0,2630	-1,336	-0,347	0,74	0,737	-0,305	-0,226	-0,573
8	- 0,025	0,30	0,2974	-1,213	-0,364	0,70	0,703	-0,353	-0,247	-0,611
9	- 0,023	0,34	0,3124	-1,163	-0,395	0,66	0,688	-0,375	-0,247	-0,642
10	- 0,015	0,38	0,3749	-0,981	-0,373	0,62	0,625	-0,470	-0,291	-0,664
11	- 0,011	0,42	0,4075	-0,898	-0,377	0,58	0,593	-0,523	-0,304	-0,681
12	- 0,010	0,46	0,4157	-0,878	-0,404	0,54	0,584	-0,537	-0,290	-0,694
13	- 0,009	0,50	0,4242	-0,858	-0,429	0,50	0,576	-0,552	-0,276	-0,705
14	0,002	0,54	0,5170	-0,660	-0,356	0,46	0,483	-0,728	-0,335	-0,691
15	0,007	0,58	0,5592	-0,581	-0,337	0,42	0,441	-0,819	-0,334	-0,681
16	0,018	0,62	0,6491	-0,432	-0,268	0,38	0,351	-1,047	-0,398	-0,666
17	0,025	0,66	0,7026	-0,353	-0,233	0,34	0,297	-1,213	-0,412	-0,645
18	0,031	0,70	0,7453	-0,294	-0,206	0,30	0,255	-1,368	-0,410	-0,616
19	0,032	0,74	0,7518	-0,285	-0,211	0,26	0,248	-1,394	-0,362	-0,573
20	0,032	0,78	0,7518	-0,285	-0,223	0,22	0,248	-1,394	-0,307	-0,530
21	0,044	0,82	0,8254	-0,192	-0,157	0,18	0,175	-1,745	-0,314	-0,471
22	0,044	0,86	0,8254	-0,192	-0,165	0,14	0,175	-1,745	-0,244	-0,409
23	0,050	0,90	0,8562	-0,155	-0,140	0,10	0,144	-1,939	-0,194	-0,334
24	0,080	0,94	0,9556	-0,045	-0,043	0,06	0,044	-3,115	-0,187	-0,230
25	0,114	0,98	0,9923	-0,0077	-0,0076	0,02	0,077	-4,867	-0,097	-0,105

Then, the empirical value criterion is Ω_l^2=-25-2 · (-12.597) = 0.1936; tabular value function *and* (Ω_l^2)= =*and*(0,19) = 0.005 very small and much less significance level q = = 0,05. That is, the hypothesis that the sample that tested belongs normally distributed general population can not be rejected. Similar calculations for other sections of the process *Z (t)* show that they have a normal distribution.

Conclusion. Thus, statistical analysis allowed to justify stationary random process and normality *z (t).* This conclusion can be extended to all diagnostic parameters of resource units and units of machines, as the study of physical factors that can cause the formation of a random process *z (t)* the operation of agricultural tractors, it also confirms.

References

1. *Sushko OV* Improving the efficiency of repair of diesel vehicle repair and service optimization actions // *OV Sushko.* - Dis. candidate. Sc. Science. - K .: 2007. - 178 p.
2. *Posvyatenko EK* Determining the optimal prediction error method the residual life of the machine component / *EK Posvyatenko, AV Sushko* // Proceedings of the National Transport University, in 2 parts: Part 2. - K .: NTU, 2011. - Vol. 24. - P. 48-51.
3. *Sushko OV* Development of a new method for determining the conditional distribution function of the residual life of machines / *OV Sushko* // Electronic resource access mode http: // nbuv. gov.ua / e% 3 Djournals / nvtdau / 2012.
4. *Wentzel ES* Probability Theory / *ES Wentzel.* - M .: Nauka, 1969. - 576 p.
5. *PosvyaTank EK* Analysis of statistical characteristics of random process parameters change resource units machines and its justification specified mathematical models / *EK Posvyatenko, AV Sushko* // Proceedings of the National Transport University, in 2 parts: Part 1. - K .: NTU, 2012. - Vol. 25. - S. 57-61.
6. *Smirnov NN* Course probability theory and Mathematical Statistics / *NN Smirnov, IV Dunyn-Barkovskyy.* - M .: Fyzmathyz, 1969. - 511 p.
7. *Tablytsы* indicators for definitions nadezhnosty elements, issues and timing of machine on the results of prediction. - M .: HOSNYTY, 1986. - 393 p.

In the work shows proverka uslovyy statsyonarnosty and normality accidentally Changed major process parameters resursnыh sostavnыh parts of machines required to implement mynymalnoy Quadratic pohreshnosty otsenok in the final prediction results on resource dyahnostyrovanyya.

Prediction, resursnыe Options, ostatochnыy resource statystycheskaya proverka, Criteria proverky.

Inspection of stationary and normality conditions of random process of resource change of main machine units for minimum quadratic error estimates when predicting their residual resource on results of diagnostics is given in paper.

Prediction, resource parametres, residual resource, statistical check, criteria of check.