Journal of the Applied Mathematics, Statistics and Informatics (JAMSI), **5** (2009), No. 1

BASES OF THE AXIOMATIC THEORY OF ECONOMIC ANALYSIS. PART III

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Abstract

In this work the exact decision of model of micrologistical systems of the accounting and the analysis of the material streams, described within the framework of the axiomatic theory of the economic analysis is given [1, 2]. Obvious expressions for the reduction local laws of deliveries of raw material Y corresponding according to the principle of reflection to some concrete laws of sales in elementary structure $\{A, C\}$ a local chain of financial production relations are found.

Mathematics Subject Classification 2000: 90B06 , 62P05
Additional Key Words and Phrases: the account, the analysis, logistics, the law of sales, reviving, the economic registration certificate (ERC).

1. INTRODUCTION

Investigating evolution of the structural organization of the economic analysis in conditions of globalization of the reviving systems, and also studying practical experience of the companies representing interests of national economic with various levels of technological way, it is possible to draw a conclusion that transformation of the economic analysis in the fundamental economic theory is possible(probable) only when in the center both analytical constructions, and practical application will be some universal economic object realizing the closed "raw material – products – market" This idea has served as motivation for creation of the axiomatic theory of economic analysis (ATEA) [1, 2] within the framework of which the major task of conceptual character connected to definition of object of research is solved: *the object of research* in ATEA is *the simple or branching global chain of financial production relations.* As basic subject ATEA *reviving* is marked – the global logistic systems in terms of which the problems of optimization of parametrical lines (form ERC3 of the economic registration certificate) and decrease in non-productive costs are investigated. Thus the TVS – methodology which includes diagram method (rules R1-R4) and a method of TVSconnections (rule R1-R9) plays essential role. In works [1, 2] the new conception of global logistics – the ERC-conception - is formulated – in basis of which is *the economic registration certificate (ERC)*, consisting of five account-analytical forms ERC1-ERC5. ERC-conception is realized at a level of local and global laws of equilibrium in simple and branching global chains of financial – production relations. Here we find obvious expressions for these laws, using designations specified in works [1 – 2]. Thus references to formulas in works [1] or [2] begin with the number of these works, for example: [2.14] means the formula (14) works [2].

2. FORMULATION OF TASK

In the construction of analytical scheme ATEA [2] fundamental role *with the relative law of reserve saving plays.*

$$I = r(t) + \int_0^t r(t-\tau)\omega(\tau)d\tau, 0 < \tau \le t, t > 0. \quad (1)$$

The equation (1) is the equation Bellman's type for unknown *function of renewal of reserve* $\omega(\tau)$, in terms of which central object ATEA – the economic registration certificate (forms ERC4 and ERC5) is formulated. Our purpose in the given work is to find decision of the equation (1) in some important cases from the applied point of view.

3. RESULTS

We find obvious structure of function of renewal $\omega(\tau)$ when the law of sales $P(t)$ with parameters M and T is determined by speed of sales $V(t)$, possessing the following properties:

(a) The speed of sales $V(t)$ is the power function

$$V(t) = V_0 t^n,\ n = 0,1,2,\ldots,\ V_0 > 0,\ 0 < t \le T \quad (2)$$

Determining coefficient V_0 from the equation

$$M = V_0 \int_0^T t^n dt \equiv V_0 \frac{T^{n+1}}{n+1}, \quad (3)$$

for the normalized function of the remain we receive

$$r(t) = (1 - \frac{1}{T^{n+1}} t^{n+1})[\eta(t) - \eta(t-T)], t > 0, \quad (4)$$

where $\eta(t)$ – is the Heavyside's function.

Value $n = 0$ in (2) corresponds to constant speed of sales $V(t) \equiv V_0$, $0 < t \le T$ and on according to (3), $V_0 = \frac{M}{T}$. Supposing in (4) $n = 0$ we have

$$r(t) = (1 - \frac{t}{T})[\eta(t) - \eta(t-T)], t > 0 \quad (5)$$

(b) Speed of sales $V(t)$ has a local maximum:

$$V(t) = c \sin\frac{\pi}{T} t, 0 < t \le T, c > 0. \quad (6)$$

Finding coefficient c from the equation

$$M = c \int_0^T \sin\frac{\pi}{T} t dt \equiv c \frac{2T}{\pi}, \quad (7)$$

for the normalized function of the remain we receive

$$r(t) = \frac{1}{2}(1 + \cos\frac{\pi}{T} t)[\eta(t) - \eta(t-T)], t > 0. \quad (8)$$

For the decision of the integrated equation (1) the operational method is used on the basis of integrated Laplas' transformation as the second item in the right part (1) looks like convolution. As functions (5), (8) are limited, parameters of growth of the function-original $\omega(t)$ and $r(t)$ in (1) are equal to zero.

Carrying out Laplas' transformation in (1) and using thus the theorem of multiplication of E.Borelja, we find

$$L(\omega) = \frac{1 - pL(r)}{pL(r)}, p = s + i\sigma, \tag{9}$$

Where $L(r)$, $L(\omega)$ – Laplas' transformations accordingly functions $r(t)$ and $\omega(t)$.

If s_0 is the order of growth of function $r(t)$ using (9), we receive the formal decision of the equation (1) for function of renewal of reserves $\omega(t)$:

$$\omega(t) = \frac{1}{2\pi i} \int_{b-i\infty}^{b+i\infty} e^{pt} \frac{1 - p\int_0^\infty e^{-p\tau} r(\tau) d\tau}{p\int_0^\infty e^{-p\tau} r(\tau) d\tau} dp, \operatorname{Re} p = b > s_0. \tag{10}$$

Laplas' at the beginning let's consider a case (a), when $n = 0$. On the basis (5) we find transformation of function $r(t)$:

$$L(r) = \frac{1}{p}(1 - \frac{1}{pT}) + \frac{1}{p^2 T} e^{-pT}. \tag{11}$$

Substituting (11) in the formula (9) we shall receive

$$L(\omega) = (1 - e^{-pT})(pT + e^{-pT} - 1)^{-1}. \tag{12}$$

Taking into account, that the order of growth s_0 the function-original $r(t)$ is equal to zero, we choose in the formula (10) value $\operatorname{Re} p = b > s_0$, $s_0 = 0$ so that the inequality $\left|(pT - 1)e^{pT}\right| > 1$ to carry out (it corresponds to straight line $\operatorname{Re} p = b$ located more right of all zero is of function (11)). Then the decision of the equation (1) can be written down in the form

$$\begin{aligned} \omega(t) = \frac{1}{T} \sum_{k=0}^{\infty} \frac{(-1)^k}{k!} [(\frac{t}{T} - k)^k \eta(t - kT) \exp(\frac{t}{T} - k) - \\ -(\frac{t}{T} - k - 1)^k \eta(t - (k+1)T) \exp(\frac{t}{T} - k - 1)]. \end{aligned} \tag{13}$$

Let's choose decisions on each of intervals $nT < t \le (n+1)T$, $n = 0,1,2,...$, from (13), using definition [2.14]:

$$
\begin{aligned}
&\omega_{0;1}(t)=\frac{1}{T}\exp(\frac{t}{T}),\\
&\omega_{1;2}(t)=\frac{1}{T}\exp(\frac{t}{T})-\frac{t}{T^2}\exp(\frac{t}{T}-1),\\
&. \quad . \quad . \quad . \quad . \quad . \quad .\\
&\omega_{n;n+1}(t)=\frac{(-1)^n}{Tn!}(\frac{t}{T}-n)^n\exp(\frac{t}{T}-n)+\\
&+\frac{1}{T}\sum_{k=0}^{n-1}\frac{(-1)^k}{k!}[(\frac{t}{T}-k)^k\exp(\frac{t}{T}-k)-(\frac{t}{T}-k-1)^k\exp(\frac{t}{T}-k-1)],\\
&. \quad . \quad . \quad . \quad . \quad . \quad .
\end{aligned}
\tag{14}
$$

Let's write on the basis (13) obvious expression for standard function of renewal

$$
\begin{aligned}
\omega^{st}(x)=\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}[(x-k)^k\eta(x-k)\exp(x-k)-\\
-(x-k-1)^k\eta(x-k-1)\exp(x-k-1)],x>0.
\end{aligned}
\tag{15}
$$

Taking into account equality (14), (15), it is easy to find that

$$
\begin{aligned}
\omega^{st}_{n;n+1}(x)=\sum_{k=0}^{n-1}\frac{(-1)^n}{n!}[(x-k)^k\exp(x-k)-\\
-(x-k-1)^k\exp(x-k-1)],n<x\le n+1,n=0,1,2,\dots
\end{aligned}
\tag{16}
$$

Formulas (16) allow to carry out full research of the standard $\omega^{st}_{n;n+1}(x)$ on intervals $n<x<n+1$, $n=0,1,2,\dots$. The behavior of function $\omega^{st}=\omega^{st}_{n;n+1}(x)$ for values $n=0$ and 1 is show on fig. 1.

Let's write now set of standard base speeds of renewal [2.17], on based (16):

$$
\begin{aligned}
&\nu^{st}_{0;1}(\frac{\tau}{T})=[1-(1-\frac{\tau}{T})]\exp(\frac{\tau}{T}),\\
&\nu^{st}_{1;2}(\frac{\tau}{T})=[1-(2-\frac{\tau}{T})](\exp(\frac{\tau}{T})-\frac{\tau}{T}\exp(\frac{\tau}{T}-1)),\\
&. \quad . \quad . \quad . \quad . \quad . \quad .\\
&\nu^{st}_{n;n+1}(\frac{\tau}{T})=[1-(n+1-\frac{\tau}{T})]\{\frac{(-1)^n}{n!}(\frac{\tau}{T}-n)^n\exp(\frac{\tau}{T}-n)+\\
&+\sum_{k=0}^{n-1}\frac{(-1)^k}{k!}[(\frac{\tau}{T}-k)^k\exp(\frac{\tau}{T}-k)-(\frac{\tau}{T}-k-1)^k\exp(\frac{\tau}{T}-k-1)]\},\\
&. \quad . \quad . \quad . \quad . \quad . \quad .
\end{aligned}
\tag{17}
$$

Schedules of base speeds of renewal [2.16] $\nu_{n;n+1}((n+1)T;\tau)=\frac{1}{T}\nu^{st}_{n;n+1}(\frac{\tau}{T})$ for $n=0,1$ are shown on fig. 2.

For the local T -law [2.20] we receive

$$m_{n;n+1}((n+1)T;t) = \gamma^{st}_{n;n+1}(\frac{t}{T}), n < \frac{t}{T} \le n+1, n = 0,1,2,\ldots, \tag{18}$$

where the standard law of renewal $\gamma^{st}_{n;n+1}(z)$ according to (5), [2.18], [2.22] is given by equality

$$\gamma^{st}_{n;n+1}(z) = \int_n^z [1-(n+1-x)]\omega^{st}_{n;n+1}(x)dx, \quad n < z \le n+1, n = 0,1,2,\ldots. \tag{19}$$

The area of the shaded flat areas on fig. 2 is as geometrical illustration of the T -law (18) for $n=0$ and 1 The reduction local law of deliveries [2.32] of raw materials Y, working in elementary structure $\{B, A\}$ of local chain of financial – production relations and corresponding to the law of sales in elementary structure $\{A, C\}$ with constant speed $V(t) = V_0$ (2) has, with the account (19), a kind

$$g_n(t) = M \int_n^{n+\frac{t}{T}} [1-(n+1-x)]\omega^{st}_{n;n+1}(x)dx, 0 < t \le T, n = 0,1,2,\ldots. \tag{20}$$

The function (20) continued on period T on all semiaxis $(0,\infty)$, determines a mode of renewal of raw material Y during any time interval $(0,t)$, $t > 0$.

Let's pass now to consideration of a case (b) when speed of sales $V(t)$ has a local maximum and is defined by equality (6).

Laplas' transformation of function (8) looks like

$$L(r) = \frac{1}{2}\left(\frac{1}{p} + \frac{p}{p^2 + \left(\frac{\pi}{T}\right)^2}\right) - \frac{1}{2}\left(\frac{1}{p} - \frac{p}{p^2 + \left(\frac{\pi}{T}\right)^2}\right)e^{-pT}. \tag{21}$$

Substituting (21) in the formula (9) we find

$$L(\omega) = \frac{\frac{1}{2}\left(\frac{\pi}{T}\right)^2\left(1+e^{-pT}\right)}{p^2 + \frac{1}{2}\left(\frac{\pi}{T}\right)^2 - \frac{1}{2}\left(\frac{\pi}{T}\right)^2 e^{-pT}}. \tag{22}$$

Let's choose in (10) $\operatorname{Re} p = b > s_0$, $s_0 = 0$ so that $\left| \dfrac{\frac{1}{2}\left(\frac{\pi}{T}\right)^2 e^{-pT}}{p^2 + \frac{1}{2}\left(\frac{\pi}{T}\right)^2} \right| < 1$ (it corresponds to the requirement according to which straight line Rep=b should be in the field of analyticity of function (2)). Then it is possible to present (22) in the form

$$L(\omega) = \frac{1}{2}\left(\frac{\pi}{T}\right)^2 \sum_{k=0}^{\infty} \frac{\frac{1}{2}\left(\frac{\pi}{T}\right)^2 \left(e^{-kTp} + e^{-(k+1)Tp}\right)}{\left[p^2 + \frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{k+1}}. \tag{23}$$

To find of the original $\omega(t)$ on Laplas' transformation (23) we enter introduce parameter λ in the formula (23) and we designate $D_\lambda^{(k)} \overset{def}{=} \dfrac{d^k}{d\lambda^k}$. Then, carrying out corresponding differential operations and supposing in the end $\lambda = 1$, it is easy to find

$$L(\omega) = \frac{1}{2}\left(\frac{\pi}{T}\right)^2 \sum_{k=0}^{\infty} \frac{(-1)^k}{k!} D_\lambda^{(k)} \left[p^2 + \lambda \frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{-1} (e^{-kTp} + e^{-(k+1)Tp}). \tag{24}$$

As $\lambda \in B(1;\delta)$, where $B(1;\delta)$ – small enough δ-vicinity of unit designating $\lambda^* = \sup\limits_{\lambda \in B(1;\delta)} \lambda$, we receive

$$\left| \int_{b-i\infty}^{b+i\infty} e^{tp} \frac{(-1)^k}{k!} D_\lambda^{(k)} \left[p^2 + \lambda \frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{-1} e^{-kTp} dp \right| \le$$

$$\le \int_{-\infty}^{\infty} \frac{e^{bt} \left[\frac{1}{2}\left(\frac{\pi}{T}\right)^2\right] e^{-kTb}}{\left[\left(b^2 + \sigma^2\right) - \lambda^* \frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{k+1}} d\sigma < +\infty. \tag{25}$$

The estimation (25) means, that function $e^{tp} \dfrac{(-1)^k}{k!} D_\lambda^{(k)} \left[p^2 + \lambda \frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{-1} e^{-kTp}$ has integrated majorant. Hence, operation of differentiation $D_\lambda^{(k)}$ on parameter λ under symbol of integral

$\int\limits_{b-i\infty}^{b+i\infty} e^{tp}\frac{(-1)^k}{k!}D_{\lambda}^{(k)}\left[p^2+\lambda\frac{1}{2}\left(\frac{\pi}{T}\right)^2\right]^{-1}e^{-kTp}dp\Bigg|$ is correct. On the basis (24) we find finally

$$\omega(t)=\frac{1}{T}\frac{\pi}{\sqrt{2}}\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}D_{\lambda}^{(k)}\{\frac{1}{\sqrt{\lambda}}\eta(t-kT)\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(\frac{t}{T}-k)+$$
$$+\frac{1}{\sqrt{\lambda}}\eta(t-(k+1)T)\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(\frac{t}{T}-k-1)\},t>0. \quad (26)$$

Choosing (26) decisions on each of intervals $nT<t\le(n+1)T$, $n=0,1,2,...$ from (26) we receive

$$\omega_{0;1}(t)=\frac{1}{T}\frac{\pi}{\sqrt{2}}\sin\frac{\pi}{\sqrt{2}}\frac{t}{T},$$
$$\omega_{1;2}(t)=\frac{1}{T}\frac{\pi}{\sqrt{2}}[\sin\frac{\pi}{\sqrt{2}}\frac{t}{T}+\frac{3}{2}\sin\frac{\pi}{\sqrt{2}}(\frac{t}{T}-1)]-\frac{1}{T}\frac{\pi^2}{4}(\frac{t}{T}-1)\cos\frac{\pi}{\sqrt{2}}(\frac{t}{T}-1),$$
$$. \quad . \quad . \quad . \quad . \quad . \quad .$$
$$\omega_{n;n+1}(t)=\frac{1}{T}\frac{\pi}{\sqrt{2}}\frac{(-1)^n}{n!}D_{\lambda}^{(n)}\frac{1}{\sqrt{\lambda}}\sin\sqrt{\lambda}(\frac{t}{T}-n)+ \quad (27)$$
$$+\frac{1}{T}\sum_{k=0}^{n-1}\frac{(-1)^k}{k!}D_{\lambda}^{(k)}\frac{1}{\sqrt{\lambda}}[\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(\frac{t}{T}-k)+\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(\frac{t}{T}-k-1)],$$
$$. \quad . \quad . \quad . \quad . \quad . \quad .$$

Taking into account equations [2.13], (26) it is easy to write out the formula for standard function of renewal

$$\omega^{st}(x)=\frac{\pi}{\sqrt{2}}\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}D_{\lambda}^{(k)}\{\eta(x-k)\frac{1}{\sqrt{\lambda}}\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(x-k)+$$
$$+\eta(x-k-1)\frac{1}{\sqrt{\lambda}}\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(x-k-1)\},x>0. \quad (28)$$

On the basis [2.14], [2.15], (26)-(28) we find

$$\omega_{n;n+1}^{st}(x)=\frac{\pi}{\sqrt{2}}\frac{(-1)^n}{n!}D_{\lambda}^{(n)}\frac{1}{\sqrt{\lambda}}\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(x-n)+$$
$$+\frac{\pi}{\sqrt{2}}\sum_{k=0}^{n-1}\frac{(-1)^k}{k!}D_{\lambda}^{(k)}\frac{1}{\sqrt{\lambda}}[\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(x-k)+ \quad (29)$$
$$+\sin\sqrt{\lambda}\frac{\pi}{\sqrt{2}}(x-k-1)],n<x\le n+1,n=0,1,2,\ldots.$$

For the normalized speed of renewal [2.8] with the account (8), [2.13] we receive

$$\nu(t;\tau)=\frac{1}{2T}[1+\cos\pi(\frac{t}{T}-\frac{\tau}{T})]\omega^{st}(\frac{\tau}{T}),0<\tau\le t,t>0. \quad (30)$$

Let $\{t_n\}_{n=1}^{\infty}$ – the any control system and t_k – any fixed point of the control. Then there is such the integer non-negative n, that $nT < t_k \le (n+1)T$ and on the basis (30) have

$$\nu_{n;n+1}(t_k;\tau) = \begin{cases} \frac{1}{2T}[1+\cos\pi(\frac{t_k}{T}-\frac{\tau}{T})]\omega^{st}_{n-1;n}(\frac{\tau}{T}), & if \quad t_k - T < \tau \le nT, \\ \frac{1}{2T}[1+\cos\pi(\frac{t_k}{T}-\frac{\tau}{T})]\omega^{st}_{n;n+1}(\frac{\tau}{T}), & if \quad nT < \tau \le t_k. \end{cases} \quad (31)$$

It is obvious, that functions (31) satisfy to the equations [2.10], [2.11].

For base control system (BCS) when $t_k = kT$, $k = 1,2,\ldots$, we receive with the account [2.16], (31) system of base speeds of renewal

$$\nu_{n;n+1}((n+1)T;\tau) = \frac{1}{T}\nu^{st}_{n;n+1}(\frac{\tau}{T}), \quad (32)$$

where standard base speed of renewal looks like

$$\nu^{st}_{n;n+1}(x) = \frac{1}{2}[1+(-1)^{n+1}\cos\pi x]\omega^{st}_{n;n+1}(x), n < x \le n+1, n = 0,1,2,\ldots. \quad (33)$$

The behaviour of function $\nu^{st}_{n;n+1}(x)$ for $n=0$ and 1 is show on fig. 3.

The local T-law [2.21] corresponding to speed of sale (6), is determined by equation

$$m_{n;n+1}((n+1)T;t) = \gamma^{st}_{n;n+1}(\frac{t}{T}), \quad (34)$$

where the standard law of renewal has the form [2.22]

$$\gamma^{st}_{n,n+1}(z) = \int_n^z \nu^{st}_{n;n+1}(x)dx = \frac{1}{2}\int_n^z [1+(-1)^{n+1}\cos\pi x]\omega^{st}_{n;n+1}(x)dx,$$
$$n < z \le n+1, n = 0,1,2,\ldots. \quad (35)$$

The geometrical illustration of the standard (35) is shown on fig. 4.

The reduction local law of deliveries of raw material Y [2.32], corresponding to speed of sale (6), is given by equality

$$g_n(t) = M\frac{1}{2}\int_n^{n+\frac{t}{T}} [1+(-1)^{n+1}\cos\pi x]\omega^{st}_{n;n+1}(x)dx, 0 < t \le T, n = 0,1,2,\ldots, \quad (36)$$

where standard function of renewal $\omega^{st}_{n;n+1}(x)$ is defined by the formula (29).

In works [1,2] we marked, that the economic registration certificate (ERC) is a basis of the analysis and the account of reviving, i.e. of all logistical activity in global chain of financial – production relation. But structure ERC is determined with three universal functions: standard function of renewal [2.13], standard base speed of renewal [2.17] and the local law of equilibrium [2.22]. It was sufficient motivation for creation of computer program (CP) "BCS-1: Accounting" with simple card of deliveries of raw material (SCD), including volumes and terms of deliveries and operating for the period of time $nt < T \le (n+1)T$, $n = 0,1,2,\ldots$ [3].

Thus, SCD provides all ten positions of account – analytical form ERC5 [2]. Conceptual model CP "BCS-1: Accounting" is shown on fig. 5.

4. CONCLUSIONS

The results received by us in this work, correspond to the general plan of construction of researches in scheme ATEA, having well defined applied aspect. It is obvious, that scheme of optimization of economic activities of the companies in the world market should have the strict scientific bases. In this plan the idea that the account and the analysis of economic activities outside of its connections with suppliers of raw material and a marketing outlets will be logically contradictory and will not provide economic growth. For example, if in frameworks of reviving to build a policy of management of material flows it is necessary to agree that at any industrial and marketing strategy the model of logistics of supply should be characterized by parameter of optimum volume of reserves, offer for sale demand. It is obvious, that the value of this parameter should be defined only by the law of sales.

Minimization of reserve expenses is in our opinion a secondary task of reviving which does not influence on the size of optimum volume of reserve. At such reviving organization the problem of measurement of reserve expenses and return on the capital enclosed in reserves can be solved. General-theoretical interest represents connection of this problem with process of optimization of parametrical series P.S. (S) and the mechanism of pricing in simple global chain FPR. All this be an object of research in the following work of the author.

5. REFERENCES

1. T.V. Shcholokova. Bases of the axiomatic theory of the economic analysis. Part I.
2. T.V. Shcholokova. Bases of the axiomatic theory of the economic analysis. Part II
3. Computer program "BCS-1: Accounting". a. c. / T.V. Shcholokova, T.G. Hmelovsky (Ukraine). – №7725; It is declared 10.04.03; Registered 15.10.03. Bulletin. №3. – p. 390.

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Received December 2008