and consistently to carry out complete to the policy in this sphere, to create sufficient safety factor, to resist to unfortunate trends and unexpected turns of a world conjuncture.

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CYCLES IN ECONOMICAL AND BIOLOGICAL PROCESSES AND POSSIBLE INFLUENCE OF OFF-SITE FACTORS ON THEM

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In the paper, an analytical review of studies of various cycles in economic processes. It is shown that economic processes obey the same laws as other physical processes on Earth. Discussed by the authors relationship cycles in economic processes to the behavior of solar activity. Provides an extensive bibliography on the problem under discussion.

From 1797 up to the latest modern crisis the World economy has come through a chain of economical cataclysms [Zyryanov, 2009] – financial crisis of 1797-1800, financial crisis of 1819-1824 (20 years later), financial crisis of 1837-1843 (18 years later), financial crisis of 1857-1860 (20 years later), depression of 1873-1896 (20 years later), financial crisis of 1893-1896 (20 years later), financial crisis of 1907-1908 (14 years later), *great depression* of 1929-1939 (22 years later), oil crisis of 1973-1975 (44 years later), crisis of 1987-1991 (14 years later), crisis dot.com of 2001-2003 (24 years later), and, at least, today` s World economical crisis.

Statistical analysis of this information shows that brightly expressed 22-year cyclicity is typical for the cataclysms mentioned above [Libin, 2009]; it is well comparable with other processes on Earth including solar activity behavior.

There is the whole series of theories which connect everything that occurs on the Earth with solar activity cycles, for example, in his theory of ethnogenesis Leo Gumilev pointed to synchronism of *passionarity impulses* with solar activity extremums.

In 1804 William Herschel (English composer, musician, mathematician, optician and astronomer, founder of stellar astronomy, member of London Royal Society and St. Petersburg Academy of Science) paid attention to a connection between wheat prices and solar radiation (depending on a number of spots on its surface) on the basis of huge material collected as a result of many year observations. He noted that during the whole century bread prices changed in compliance with the solar activity maximums. So, Herschel became a founder of a new science – heliobiology.

In 1880 William Stanly Jevons, one more great English scientist (one of the pioneers of using mathematical methods in economy), worked out an original theory of an economical cycle in his article *The Solar Period and the Price of Corn*. According to Jevons` theory, *years of rich crops* repeats every ten or eleven years and «it is difficult to believe that trade crises are connected with periodic weather change touching all parts of the World and appearing, probably, as a result of increased hot waves got from the Sun in every ten years on the average». Jevons also supposed that behavior of different groups depended on cyclic phenomena on the Sun as well. It helped him to explain economical cycles not only in the agriculture where they are connected with direct influence of solar activity on crop capacity but also in industry.

Jevons` suppositions were rather reasonably explained – as a number of spots on the solar disk influence the weather, consequently, it influences crops as well. The latter in their turn influence trade condition. That is why Jevons confirmed that the day would come *when in the London City they will look for the Sun condition as attentively as they looked for the condition of the English Bank before*.

Henrich von Schwabe, a German astronomer, was the first who discovered ten-year periodicity of sunspot appearance in 1843. And in 1848 Johann Rudolf Wolf worked out a methodology of sunspot calculation – the received number is called the Wolf number – $W = k(f + 10g)$, where f is a number of all separated spots observed on the solar disk at the given moment, and g is a number of groups formed by them. This index very successfully reflects contribution to solar activity (SA) from not only spots themselves, but from the whole active area, mainly occupied by faculae. (That is why W numbers conform well to the more modern and more precisely defined index denoted as F10.7, a value

a radio-frequency radiation flux from the whole Sun on 10,7 sm wave). In 1952 Wolf specified periodicity of sunspot appearance as 11-year arithmetical means of their period, although in reality the cycles last from 8 to 14 years (between minimums) and from 7 to 17 years (between maximums).

Alexander L. Chijzhevsky, a Russian scientist, paid attention to synchronism of solar activity and processes occurring on the Earth in the beginning of 20`s of the last century [Chijzhevsky, 1976, 1990, 1995]. Chijzhevsky defined the life as a living thing's capability to let through a flood of cosmic energy, and considered that the biosphere is the place of transformation of cosmic energy emphasizing by it that life is a more cosmic phenomenon, then an Earth's one. Discovering of the cosmic factor's influences on biological, science and social processes is one of the most important contributions to the modern science approach.

He wrote in his work *An Earth's Echo of Solar Hurricanes*, *«Eruptive activity on the Sun and biological phenomena on the Earth are co-effects of one common reason – the great electromagnetic life of the Universe. This life has a pulse, its periods and its rhythms…Life is not the result of a chance game of only the Earth's powers. It is created by influence of the Cosmos creative dynamics on the Earth's inert material. It lives with dynamics of these powers, and each organic pulsation conforms to the cosmic heartbeat, this enormous complex system of the Universe material objects. During a very long period of time of cosmic powers influence on the Earth, definite cycles of phenomena which are correctly and periodically repeated in space and time have strengthened. Everywhere on the Earth we find cyclic processes which are the result of cosmic power influence. In this endless number of cyclic processes one can hear world's pulsation, a great dynamics of nature, different parts of which resound one with another consonantly and harmoniously».*

It was found out later that climatic processes – glaciers, warming, recurrence of typhoons and earthquakes, precipitation – are also connected with the Sun. Degree of the Arctic and Antarctic ice coverage, variations of ocean levels, the Gulfstream pulsation, a sea thermal regime are connected with 11-year, 22-30-year and 100-year cycles. Alexander Chijzhevsky also discovered coincidence of solar maximums with periods of pandemic and epizootic and also of accelerated reproduction of some biological species, for examples, locusts.

The largest frequency of pandemic and epizootic was really observed in the second millennium A.D. during the 30-80s of the 14th century when locust plague in Central Europe lasted with a 10-12 year periodicity in 1333-1341, 1353-1363, 1373-1388 and resulted in mass crop failure and hunger. A peak of natural cataclysms fell on the year 1348 when, according to von Megensberg`s description [Kuzmenko, 1999], a wave of some awful earthquakes with destruction of tens of cities and hundreds of temples swamped the whole Europe from South to North, from East to West. According to Vinario, an Italian scientist, a contemporary of those events, *forests were burning, rivers burst their banks and plague killed millions of people on different continents* with a 11-year periodicity of pandemic outburst.

As a result of many researches in economics and sociology some processes were noted, their phase alteration tells us if not about their cyclicity, but about a wavy character of their behavior. First of all an industrial 7-12 year cycle was found out. In this cycle K. Marks separated four phases which changed each other consequently – crisis, depression, revival, recovery. This cycle was called ***a business (classical) cycle of Marks-Juglar.*** (K. Juglar, a famous economist, analyzed fluctuations of interest rates and prices in France, Great Britain and the USA and found coincidence of them with cycles of capital investments, change of the gross national product (GNP), inflation and employment. There are 11 Marks-Juglar cycles in the period since 1787 to 1932. By the way, insurance market operates cyclically with a period of 7-10 years).

J. Kitchin`s cycles are cycles of inventory movement with a period from 2 to 4 years.

Simon Kuznets, a Nobel Prize winner of 1971, contributed to the cycle theory in the economy, analysis of production and price dynamics and cyclical oscillations and seasonal changes in industry and trade. He discovered interconnected oscillations of national income, consumer expenses, gross investment to production equipment, to buildings and installations with long-term intervals of fast growth and deep recessions. His works corresponding to new economical demands gave a grounding for the gross national product (GNP) and its constituent parts estimation by the Federal Government of the USA, influenced further researches of economical growth, permitted to work out the only methodology of national income and the GNP calculation for all World countries. **Kuznets` s cycle** or **long swings** possessing the largest amplitude in building has a 20-year cycle.

N.D. Kondratyev (1892-1938) [Kondratyev, 1928, 2002], a Soviet economist, shot in the Suzdal prison, created an economical theory of long waves, large conjuncture cycles (40-60 years). In the World economics he is famous, first of all, as the author of the *long wave* conception in which he developed an idea of plurality of economical cycles. Besides well-known medium-term cycles (8-12 years) Nikolai Kondratyev discovered *58-64 year oscillations* of economical activity, which are called now after him. Kondratyev wrote, «The real process of economical activity is single. But if analyzing and decomposing this process to the simplest elements and forms we admit the existence of different cycles in this dynamics, together with it we must admit that these cycles interlace with each other somehow and exert this or that influence on each other».

Kondratyev`s cycle or *large conjuncture waves* were received from the analysis of statistical materials (price dynamics, rate of interest, salary, foreign trade figures, production outputs of the main industrial production types) for 1780-1920 of such countries as England, France, Germany, the USA and also in whole of the World agriculture. For the analyzed period Kondratyev separated two full large cycles (from 1780s to 1840s and from 1850s to 1980s) and the beginning of the third one (from 1900s). As each cycle consisted of recovery and recession he *could essentially predict the Great Depression of 1929-1933 some years before its beginning.* Besides, Kondratyev found interconnection of economical cycles with cyclic processes in other spheres of societies.

Today, besides Schwabe-Wolf' s cycle, we know ***Gansky`s 72-year cycle, Rubashev` s 600-year cycle, Gnevyshev-Ol` s 22-year pair cycle. K. Jensen separated 17-year freight cycle*** – Holland shipwrights played serviceable life of their ships up to it [http://www.ogoniok.com/archive/1998/4580/45-56-61].

There is a great number of other cycles – super long 390-year and 1800-year cycles, 169-180 year cycle, 80-90 and quasi-two year and also economical 36-40 year ones.

Synchronism of solar maximums with war and revolution periods was discovered. It was only necessary to clear up the mechanism of interconnection of society and a human organism with the Sun [Chijzhevsky, 1932].

The Sun is not a solid body; it rotates so that some parts always move relative to the others. In such systems constant generation of the most powerful magnetic fields takes place. These are magnetic fields on the Sun which interacting with each other cause what we call solar activity. Moreover, solar magnetic fields interact with terrestrial ones. As a result we receive what we call magnetic storms. Just they but not the Sun influence biological and technical systems of the Earth. But the more complicated the system, the weaker the impulse destroying it is and the more difficult it is to estimate consequences of such influence. For the period of 11-year solar cycle about 500 magnetic storms happen. Flashes of solar activity are especially dangerous for those who suffer from cardiovascular diseases. Reaction of managers, drivers, operators becomes weaker. Amplitude of magnetic fluctuations increases from south to north latitudes, and, for example, railway accidents happen more often in the Arkhangelskaya region.

In 1989 a magnetic field left Canadian capital Ottawa and Quebec without electricity for 8 hours. In 1997 a solar storm cut off television satellite Telstar 401 of AT&T Company. Next year a storm destroyed work of satellite Galaxy IV which managed automatic cash terminals and aviation tracking systems. In 2000 Japan satellite Asko damaged by a solar storm failed and sank in the Pacific Ocean. Magnetic fields tell on work of mobile phones, arouse failures in the Internet, automatic systems, disturb high-frequency aviation radio communication. On Russian railways there have been accidents connected with failures of automatic devices.

It is interesting that there were no economical crises during periods of increasing solar activity. We should say that similar action of solar minimums and maximums is not something new. So, for example, detailed dendrochronological observations [Dergachev, 2000] fixed not only substantial increase of tree growth during solar maximums but its intensification, although a less one, near 11-year solar cycle minimums. Such peculiarities are connected with the fact that geoactive areas on the Sun cause magnetic storms and other changes in the sphere of the Earth appear during sunspot maximums and minimums as well.

Fast growth of the World economy since the second part of 20th century has led to absence of brightly expressed minimums of the GNP values in the given period of time, which, however, does not mean absence of cyclicity. In the given period of time cycles can be separated according to decrease of the GNP growth rate. Extreme characteristic of solar activity value does not have to lead to sudden change of economical growth indicator; its influence can be manifested with some delay, and the existence of economic crises on descending parts of solar activity cycles can be connected with that.

There are rather reliable data about dynamics of the GNP specific value of the most powerful economical empire of the second part of the 20th century – the USA. The analysis of given data shows that solar maximums are followed by slowdown or fall of American economy growth rate. A maximal yearly average W number for the 20th century falls on 1957. In the same year the GNP specific value of the USA fell [Zyryanov, 2009]. In the second half of the 20th century economy growth retardation during solar maximum was noted practically for all leading economical states of the World. After solar maximum of 2000 in all these countries we observed economy recession or, at least, its growth retardation.

It is necessary to note that in the second part of the 20 century a global economic cycle is not of a sinusoidal character – a relatively short-term economic recession (about 2-5 years) is followed by a much longer period of its growth.

Coincidence of some solar activity cycles (11-year, 22-year, 100-year, 400-year and 900-year ones) in the beginning of 21st century led to the most powerful Sun influence on the Earth, substantial increase in electric activity of the atmosphere (which resulted in more frequent thunderstorms and tornadoes in areas close to the equator, and people became more sensible to magnetic fields than before) and sudden intensification of all helioclimatic, heliobiological and helioeconomical connections.

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ABOUT THE FIRMNESS OF THE UNIVERSAL VALUES AND THE CONTRIBUTION TO WORKING OUT OF THE INTERDISCIPLINARY APPROACH IN ELENA RUMYANTSEVA'S WORKS

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The formation of the more perfect paradigm of the social development in the modern system of the alignment of forces is realized mainly among the high-ranking politicians. And they involve the capitals under this political platform and on this basis influence change of the public consciousness through popularization of the ideas through mass media and the state institutes. The given process is included today into the contradiction with those riches of the knowledge which collected centuries-old stories of the human consciousness and were comprehended in works of world famous persons.

By E.E. Rumyantseva (born 1966) it is published more than 50 books and more than 250 scientific articles, including more than 80 articles in the magazines from the list VAK (http://viperson.ru/wind.php?ID = 654178&soch = 1). On the all significant works published since 1992, there are available numerous (more than 17 thousand) references in the lists of the references in the theses for the candidate and doctoral degree on the more than 20 scientific specialities in the all Russian Federation cities that testifies from its outstanding contribution to the history of a domestic science development and a propagation of the approaches and the knowledge maintaining to the criticism and the long-term scientific disputes within 20 years. In the first of the all this is concerned of the outstanding contribution to the propagation of the highly professional knowledge in her «New economic encyclopedia», sustained 4 editions for 2005-2012. It is quoted or used as the base of a knowledge propagation in the Russian Federation on the scientific specialities in the field of economy 08.00.01, 08.00.05 (on all specializations), 08.00.10, 08.00.12, 08.00.13, 08.00.14, 05.13.10 and other sciences – pedagogics, the rights, philosophies, political science, stories, sociology, philology, geography, engineering science.

How Elena Rumyantseva fairly allocates in her works, the system of the modern knowledge lags behind today use of the saved up the world intellectual heritage and settles in a conjuncture plane, political shocks, a race for power and a superprosperity, including property redistribution, and in the past century – for the new territories capture and an enthralled the people.

The science development as the process of the knowledge of the objective truth necessary for all mankind, for each known thinker whether it be the politician, the civil servant, the scientist or the millionaire is some kind of the sacrament and simultaneously test, the suffering causing admiration of the persons, the spent researches perceiving results, mainly not self-interested, as internal self-return and a civil feat of the researcher.

In our opinion, Elena Rumyantseva is already managed to prove in the works that the modern world of a science is inseparable from practice and from outlook, systems of the valuable categories of the citizens making a basis of the movement to defined, is possible out of a legal regulation to the development purposes. From here – questions of the advantage and the protection of the rights and freedom of the citizens, restoration of the eternal moral values that was the main theme of its researches last years (the trilogy «Happiness Economy», «Moral laws of economy», «If it is the Love in the World…», the monographies devoted to a combination of the matters of the law, morals and economy, to the questions of a counteraction of the corruption, working out of approaches to an estimation of the efficiency of economic policy and its directions, and also the analysis of the world heritage of economic thought under primary sources). We consider that the given approach has the international character and is a point of issue at the international level.

The list of the most significant books of Elena Rumyantseva from the point of a view of the knowledge propagation by the international public, their recognitions at interstate level and uses by working out of the international legal certificates is resulted more low: