

Министерство образования Республики Беларусь

**Учреждение образования
«Гомельский государственный университет
имени Франциска Скорины»**

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АНГЛИЙСКИЙ ЯЗЫК

ECONOMIC CYBERNETICS

ПРАКТИЧЕСКОЕ ПОСОБИЕ

для студентов специальности 1-31 03 06-01
«Экономическая кибернетика (математические методы и
компьютерное моделирование в экономике)»

Гомель 2017

УДК 811.111:(076.5)
ББК – 81.4321я73
К-51

Рецензенты:

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Рекомендовано к изданию на заседании научно-методическим советом учреждения образования «Гомельский государственный университет имени Франциска Скорины».

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К-51 Английский язык: практическое руководство для студентов специальности 1-31 03 06-01 Экономическая кибернетика (математические методы и компьютерное моделирование в экономике) / М.В.Короткая, Г.Н.Петухова; М-во образов РБ, Гомельский гос. ун-т им. Ф.Скорины. – Гомель: ГГУ им.Ф.Скорины, 2017 – 45 с.

ISBN 978-985-439-327-8

Целью практического пособия является формирование навыков чтения и перевода текстов по специальности студентов факультета математики и технологий программирования.

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ISBN 978-985-439-327-8

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ПРЕДИСЛОВИЕ

Практическое пособие представляет собой сборник текстов разнообразных по тематике и охватывающих широкий круг вопросов, связанных с использованием компьютерных технологий в экономике. Целью пособия является формирование навыков чтения и перевода текстов по специальности 1-31 03 06-01 Экономическая кибернетика (математические методы и компьютерное моделирование в экономике).

Пособие состоит из пяти основных разделов: «Cybernetics», «Economic Cybernetics», «E-Commerce and E-Banking», «Money – the Basics» and «Supplementary Reading». Каждый раздел включает следующие части:

- список ключевых слов и выражений, используемых в тексте;
- предтекстовые упражнения и темы для обсуждения, направленные на облегчение восприятия рабочего текста и на развитие навыков монологической и диалогической речи;
- собственно профессионально ориентированный текст для поискового, изучающего или просмотрового чтения;
- послетекстовые упражнения и задания, ориентированные как на проверку понимания содержания текста, так и на закрепление языкового материала, а также на формирование, развитие и совершенствование соответствующих коммуникативных навыков.

Подобранные тексты расширяют активный запас профессиональной лексики, знакомят с грамматическими структурами, широко используемыми в текстах такой направленности.

Предложенный материал способствует глубокому овладению изучаемым языком, расширению кругозора и эстетическому воспитанию студентов.

UNIT 1. CYBERNETICS

1. Practise reading the following words. Try to memorize them.

constraint – ограничение

junction – стык, связь, точка соединения

semiotics – семиотика, или семиология (от др.-греч. «знак, признак»), – наука, исследующая свойства знаков и знаковых систем, используемых в процессе общения

to imply – подразумевать, означать, предполагать

applicable – применимый, подходящий, пригодный

to incorporate – включать в состав, объединять

loop – цикл

feedback – обратная связь, отклик

to trigger – вызывать, побуждать

cognitive – познавательный

to accomplish – выполнять, совершать, завершать

black box – черный ящик (термин, используемый для обозначения системы, внутреннее устройство и механизм работы которой очень сложны, неизвестны или неважны в рамках данной задачи, когда вместо свойств и взаимосвязей составных частей системы, изучается реакция системы как целого на изменяющиеся условия)

emergence – появление, возникновение

convergence – сходимость, сближение в одной точке, слияние каких-либо признаков и элементов в независимых друг от друга явлениях

engineering – машиностроение, инженерное искусство, техника, проектирование

governance – управление, руководство, власть

pertinent – имеющий отношение, уместный, подходящий

to steer – управлять, руководить

neuroscience – неврология (отрасль медицинской науки, занимающаяся изучением нервной системы, методов диагностики и лечения неврологических заболеваний)

purpose – цель, намерение, назначение

2. *Make up word combinations with the following words.*

1. system	a. modeling
2. accomplish	b. change
3. logic	c. tasks
4. closed	d. information
5. mechanical	e. management
6. interdisciplinary	f. network
7. process	g. engineering
8. black	h. loop
9. business	i. box
10. electrical	j. study

3. *Read and translate the following texts. Match these captions with the texts below.*

- The field of study of cybernetics
- The aim of cybernetics
- The concept of cybernetics
- The origin of cybernetics
- The application of cybernetics

What is Cybernetics?

1. Cybernetics is a transdisciplinary approach for exploring regulatory systems – their structures, constraints, and possibilities. It originated “at the junction” of mathematics, logic, semiotics, physiology, biology and sociology. Norbert Wiener defined cybernetics in 1948 as “the scientific study of control and communication in the animal and the machine”. In the 21st century, the term is often used in a rather loose way to imply “control of any system using technology.”

2. Cybernetics is applicable when a system that is being analyzed incorporates a closed signaling loop. That is, where action by the system generates some change in its environment and that change is reflected in the system in some manner (feedback) that triggers a system change. Cybernetics is relevant to, for example, mechanical, physical, biological, cognitive, and social systems. The essential goal of the broad field of cybernetics is to focus on how anything (digital,

mechanical or biological) processes information, reacts to information, and changes or can be changed to better accomplish the first two tasks.

3. Cybernetics includes the study of feedback, black boxes, and derived concepts such as communication and control in living organisms, machines, and organisations including self-organisation. Concepts studied by cyberneticists include, but are not limited to: learning, cognition, adaptation, social control, emergence, convergence, communication, efficiency, efficacy, and connectivity. In cybernetics these concepts (otherwise already objects of study in other disciplines such as biology and engineering) are abstracted from the context of a specific organism or device.

4. The word *cybernetics* comes from Greek κυβερνητική (*kybernetike*), meaning “governance”, i.e., all that are pertinent to κυβερνάω (*kybernao*), the latter meaning “to steer, navigate or govern”, hence κυβέρνησις (*kybernesis*), meaning “government”, is the government while κυβερνήτης (*kybernetes*) is the governor or the captain. Contemporary cybernetics began as an interdisciplinary study connecting the fields of control systems, electrical network theory, mechanical engineering, logic modeling, neuroscience, anthropology, and psychology.

5. Studies in cybernetics provide a means for examining the design and function of any system, including social systems such as business management and organizational learning, including for the purpose of making them more efficient and effective.

4. When you read texts like these, you don't always need to understand every word. But there are words which you can guess from the context. Look at these words. Are they nouns (n), verbs (v) or adjectives (adj)?

focus	analyze	specific
regulatory	relevant	governor
structure	essential	engineering
possibility	information	means
generate	derive	management
control	emergence	business
applicable	efficiency	

5. Now match the words below with the similar meanings of Task 4.

manager	explore
data	important
originate	productivity
particular	pertinent
supervision	originate

6. Read and translate the following abstract as to pick out international words.

Definitions

Cybernetics has been defined in a variety of ways, by a variety of people, from a variety of disciplines. Cybernetician Stuart Umpleby reports some notable definitions:

– “Science concerned with the study of systems of any nature which are capable of receiving, storing and processing information so as to use it for control.” – *A.N. Kolmogorov*

– “A branch of mathematics dealing with problems of control, recursiveness, and information, focuses on forms and the patterns that connect.” – *Gregory Bateson*

– “The art of effective organization.” – *Stafford Beer*

– “The science and art of understanding.” – *Humberto Maturana*

7. Look through the text “Early 20th century” as to agree or disagree with the following statements.

1. N. Wiener never drew analogies between automatic systems (such as a regulated steam engine) and human institutions.

2. W.G. Walter was one of the first to build self-directed robots as an aid to the study of animal behaviour.

3. Cybernetics as a discipline was decisively established by Charles Babbage.

4. Further proof of the somewhat surprising universality of cybernetic study is the concept that the same properties of genetic replication applied to social memes, living cells, and even computer viruses.

5. In the early 1940s John von Neumann contributed a unique addition to the world of cybernetics in the form of his famous works *von Neumann cellular automata*, and their logical follow up, the *von*

Neumann Universal Constructor.

Early 20th century

Cybernetics as a discipline was firmly established by Norbert Wiener, W.R. Ashby, mathematician Alan Turing, W.G. Walter (one of the first to build autonomous robots as an aid to the study of animal behaviour), and others.

In the early 1940s John von Neumann, although better known for his work in mathematics and computer science, did contribute a unique and unusual addition to the world of cybernetics: *von Neumann cellular automata*, and their logical follow up, the *von Neumann Universal Constructor*. The result of these deceptively simple thought-experiments was the concept of self-replication, which cybernetics adopted as a core concept. The concept that the same properties of genetic reproduction applied to social memes, living cells, and even computer viruses is further proof of the somewhat surprising universality of cybernetic study.

In 1950, N. Wiener popularized the social implications of cybernetics, drawing analogies between automatic systems (such as a regulated steam engine) and human institutions in his best-selling *The Human Use of Human Beings: Cybernetics Society*.

8. Read the text “Early 20th century” (of Task 7) again and answer the following questions.

1. Who firmly established cybernetics as a discipline?
2. What was John von Neumann better known for in the early 1940s?
3. What kind of idea did cybernetics adopt as a core concept?
4. The concept stated that the same properties of genetic reproduction applied to social memes, living cells, and even computer viruses, didn't it?
5. When did N. Wiener popularize the social implications of cybernetics?

9. Look at the texts (of Task 3,6,7) again and discuss these aspects with your partner.

1. Cybernetics is a transdisciplinary approach for exploring regulatory systems.

2. Cybernetics is applicable when a system that is being analyzed incorporates a closed signaling loop.

3. In cybernetics many concepts are abstracted from the context of a specific organism or device.

4. Studies in cybernetics provide a means for examining any system.

5. Cybernetics has been defined in a variety of ways.

6. The history of cybernetics (early 20th century).

10. Speak on the topic “What is Cybernetics?”.

11. For more information see Unit 5 Supplementary Reading “To Unit 1”.

UNIT 2. ECONOMIC CYBERNETICS

1. Repeat the following words and phrases after the teacher (minding stresses) and memorise them.

scientific field – научная область

to be concerned with smth – заниматься чем-либо

to expand – расширять, развивать, распространять

operations research – исследование операций

econometrics – эконометрика (наука, изучающая количественные и качественные экономические взаимосвязи с помощью математических и статистических методов и моделей)

to articulate – ясно выражать, произносить

to streamline – рационализировать, модернизировать

equipment – оборудование

investigation – исследование, расследование

to rely (up)on smb/smth – полагаться на кого-либо/что-либо

flow – поток

to circulate – быть в обращении, распространяться

comprehensive – всесторонний, исчерпывающий, обстоятельный, комплексный

refinement – усовершенствование, улучшение, повышение качества

2. Find Russian equivalents to the words below.

application

communication

accurate

element

operation

characteristic

component

symbolic

to standardize

optimal

transmission

organization

composition

process

line

control

to coordinate

actual

model

to concentrate

to function

analysis

to plan

3. Read and translate the following text. Agree or disagree with the statements below.

1. Economic cybernetics is developing along four main lines that are being coordinated ever more closely.

2. Economic cybernetics considers the economy and its structural and functional components as separate independent aspects.

3. Economic Cybernetics a scientific field occupied with the use of cybernetic ideas and methods to economic systems.

4. Special attention is devoted to planning and directing the fulfillment of plans, including study of the methodology, philology, and the use of financial models.

5. The theory of economic information investigates the characteristics of information channels and the messages transmitted along them.

Economic Cybernetics

Economic Cybernetics is a scientific field concerned with the application of cybernetic ideas and methods to economic systems. In an expanded and not entirely accurate sense, economic cybernetics is often taken to mean the field of science that has developed at the junction of mathematics and cybernetics with economics, including mathematical programming, operations research, mathematical economic models, econometrics, and mathematical economics.

Economic cybernetics considers the economy and its structural and functional components as systems in which the processes of regulation and control are carried on by the flows and conversion of information. The methods of economic cybernetics make it possible 1) to standardize this information and articulate it; 2) to streamline the receipt, transmission, and processing of economic information; and 3) to work out the structure and composition of data-processing equipment.

Economic cybernetics is developing along three main lines that are being coordinated ever more closely: 1) the theory of economic systems and models, 2) the theory of economic information, and 3) the theory of controlling systems.

The theory of economic systems and models considers the methodology for doing systems analysis of an economy, modeling the economy, and reflecting the structure and functioning of the economic

systems in the models. In its investigation of these problems economic cybernetics relies primarily on political economy and general systems theory, as well as on sociology and control theory.

The theory of economic information considers the economy as an information system. It studies information flows circulating in the national economy as communication among its elements and subsystems. It also investigates the characteristics of information channels and the messages transmitted along them; economic measurements and symbolic systems in the economy generally; and decision-making and data-processing processes in the information systems of the national economy at all levels, including questions of optimal organization of these processes. Here economic cybernetics touches closely on information theory (research to determine the usefulness and value of information), semiotics, programming theory, and information science.

The theory of controlling systems in economics brings research in other areas of economic cybernetics together and gives it actual form. It concentrates on comprehensive study and refinement of the control system for the national economy and for separate economic units and, in the last analysis, on their optimal functioning. Special attention is devoted to planning and directing the fulfillment of plans, including study of the methodology, technology, and organization of control functions and the use of mathematical economic models and other scientific methods in control practice.

4. Find in the text English equivalents to the words below.

получение	в первую очередь, прежде
определить ценность	всего
точный	передавать выполнение
процесс принятия решений	преобразование
народное хозяйство	отражать
разрабатывать	рассматривать
понятие	наука об обществе
	посвящать

5. *Ask questions to the following statements.*

1. Economic Cybernetics is a scientific field concerned with the application of cybernetic ideas and methods to economic systems. (what... with)

2. Economic cybernetics considers the economy and its structural and functional components as systems. (in what way...)

3. The theory of economic systems and models considers the methodology for doing systems analysis of an economy, modeling the economy, and reflecting the structure and functioning of the economic systems in the models. (what...for)

4. The theory of economic information studies information flows circulating in the national economy as communication among its elements and subsystems. (what kind of information flows...)

5. The theory of controlling systems in economics brings research in other areas of economic cybernetics together and gives it actual form. (who)

6. *Find in the text words of Latin and Greek origin and write them out.*

7. *Look through the text, find the derivatives of these verbs and say what part of speech they are.*

to organize

to include

to use

to value

to refine

to separate

to function

to circulate

to characterize

to expand

to structure

to regulate

to convert

to transmit

to compose

to equipment

to model

to measure

to concern

to apply

8. *Concept check. Ask your partner questions to the text of Task 3.*

9. *Practise reading the following words and translate them into Russian.*

Science, queen, mathematics, mathematician, chemistry, biology,

linguistics, astronomy, physics, mechanics, phenomenon, especially, progress, opportunity, possibility, cybernetics, optimization, analyst, fundamental, to analyze, guidance, synthesis, microeconomics, macroeconomics, finances, technique, graduate, control, equation, to offer, to apply, to process data, to consist of, to pay attention to, to do one's best.

10. Make up word-combinations with the following words and memorise them.

statistical	equation
intellectual	optimization
operational	networks
to offer	companies
sphere of	knowledge
differential	property
exact	models
computer	calculation
scientific	research
fields of	opportunities
decision	sciences
leading	progress
data	influence

11. Match the words having similar meaning.

to apply	investigation	to learn
significant	symbol	probation
to make	to study	to begin
computation	various	speed
research	to calculate	in the field of
velocity	installation	to produce
sign	to start	different
to use	in the sphere of	practical training
important	to compute	setting up
data	information	calculation

12. Read and translate the text paying attention to the names of special subjects (for the translation of the subjects consult Unit 5 Supplementary Reading “To Unit 2”).

Economic Cybernetics is my Future Speciality

Our department offers great opportunities for studies. We are taught general subjects as well as special ones. My speciality is economic cybernetics, so the instruction involves *mathematical analysis, algebra and geometry, computer and programming, introduction to economical cybernetics, economics, discrete mathematics, common differential equations, differential equations with partial derivatives, matrix analysis, computational approaches (calculation methods) of algebra, functional analysis and integral equations, probability theory and mathematical statistics, theory of algorithms, micro- and macroeconomic models, privatization fundamentals, computer networks, data models and DBMS, methods of numerical analysis, optimization methods, economico-mathematical methods of production control, operational research (operations research), simulation and statistical modelling, economic analysis and accounting fundamentals, finance and economic management models, mathematical economic theory, econometrics, protection of labour, office work, investment planning, intellectual property management, financial market models, decision optimization in economics and business, mathematical theory of financial risk.*

Actually, my future profession will be connected not just with computers or economy but with using information technology in the field of economics. “Economic cybernetics” offers mathematical and informational support for economic activity, so the speciality combines fundamental economic education and advanced knowledge of computer technology. A specialist of this profession – economic analyst – is able to create mathematical computer models for economic systems, analyze these models, develop strategies for optimal control of these systems and propose practical guidance on the improvement of economic development.

In the first and second years our students study advanced mathematics and informatics, and get acquainted with economic science together with students of other specialities.

During the rest of the course students get advanced knowledge in

economics, modelling and information technology. Here microeconomics, macroeconomics, finances and credit are being analyzed by the instrumentality of mathematical techniques and models using modern world achievements.

After university many graduates are able to take up the following positions: economist-analyst, informational analyst, system analyst, financial analyst; analyst of computer communications, computer systems and data banks; information system developer; mathematician-economist; applied programmer, programmer-analyst, application developer; web-master, web-programmer; consultant on informational technologies; automatic job control systems engineer; consultant on economic problems; informational manager, accountant, bank specialist and others. This is a possibility to work in the leading companies, research-and-development centers, in both industrial and government sectors.

After graduating I'll become a *mathematician-economist (cybernetist-economist)*. I'll solve economic problems with the help of mathematics and programming. The synthesis of mathematics and economics provides great possibilities for a specialist both in science and production.

13. Look through the text, find the derivatives of these verbs and define their part of speech.

to connect	to manage
to inform	to model
to compute	to think
to analyze	to function
to produce	to advance
to use	to consult
to apply	possible
to build	to profess
to know	to introduce
to calculate	to graduate
to simulate	to develop

14. Answer the questions to the text.

1. What will your future profession be connected with?
2. Your department provides a broad progressive education,

doesn't it?

3. What is the aim of the course?
4. Which subjects do the students of economic cybernetics study?
5. What will you become after graduating?
6. Where can you work? Which company would you like to work for after graduating?

15. Speak on the topic "My Future Speciality as I See it".

16. For more information on the history of economic cybernetics see Unit 5 Supplementary Reading "To Unit 2".

UNIT 3. E-COMMERCE AND E-BANKING

1. Practise reading the following words. Try to memorize them.

goods – товары	online payments – онлайн-платежи
provide – предоставлять	try on – примерять
incentives – стимулы	bricks-and-mortar businesses – кирпичные предприятия
purchase – покупка	coexist – сосуществовать
mall – торговый центр	business-to-consumer – бизнес-потребитель
associated with – связанный с	oftentimes – часто
retail outlet – розничная торговая точка	consumer-to-consumer – потребитель-потребитель
staff – сотрудники	business-to-business – бизнес для бизнеса
inventory – наличие	manufacturer-supplier – производитель-поставщик
replenish – пополнять	
warehouse – склад	
inability – неспособность	
immediate delivery – немедленная доставка	

2. Make up word-combinations with the following words and memorize them

1 online	A staff
2 retail	B inventory from warehouses
3 to provide	C payments
4 electronic	D delivery
5 sales	E outlet
6 immediate	F incentives
7 replenish	J commerce

3. Match the words having similar meaning.

Merchandise, fit on, to provide, staff, purchase, inability, manufacturer, goods, producer, to guarantee, mall, personnel, warehouse, try on, shopping center, buy, store, impossibility

4. Give definitions to the following

1. a person or company that makes goods for sale.
2. all the people employed by a particular organization.
3. exist at the same time or in the same place.

4. make available for use; supply.
5. a complete list of items such as property, goods in stock
6. the state of being unable to do something.
7. a person who purchases goods and services for personal use.

5. *Translate the following word combinations. Use your dictionaries. Make up sentences of your own.*

1. consumer goods, consumer good, consumer products, consumer electronics, consumer price index, consumer spending, consumer durables, consumer market, consumer society, consumer behavior

2. sale, sales manager, sales representative, sales assistant, sales executive, sales tax, sales clerk, sales department, sales force, sales promotion, sales revenue, sales manager

3. delivery date, delivery time, delivery note, place of delivery, cash on delivery, terms of delivery, delivery boy, delivery order, special delivery, delivery service

4. associate, associate with, sales associate, business associate, research associate, associate director, associate professor, associate member, associate dean, associate editor

6. *Read, translate and analyze the text.*

Electronic commerce

Electronic commerce, also known as *e-commerce*, is the buying and selling of goods over the Internet. Have you ever bought anything over the Internet? Probably, you have. Shopping on the Internet is growing rapidly and there seems to be no end in sight.

The underlying reason for the rapid growth in e-commerce is that it provides incentives for both buyers and sellers. From the buyer's perspective, goods and services can be purchased at any time of day or night. Traditional commerce is typically limited to standard business hours when the seller is open. Additionally, buyers no longer have to physically travel to the seller's location. For example, busy parents with small children do not need to coordinate their separate schedules or to arrange for a baby sitter whenever they want to visit the mall. From the seller's perspective, the costs associated with owning and operating a retail outlet can be eliminated. For example, a music store can operate entirely on the Web without an actual physical

store and without a large sales staff. Another advantage is reduced inventory. Traditional stores maintain an inventory of goods in their stores and periodically replenish this inventory from warehouses. With e-commerce, there is no in-store inventory and products are shipped directly from warehouses.

While there are numerous advantages to e-commerce, there are disadvantages as well. Some of these disadvantages include the inability to provide immediate delivery of goods, the inability to “try on” prospective purchases, and questions relating to the security of online payments. Although these issues are being addressed, very few observers suggest that e-commerce will replace bricks-and-mortar businesses entirely. It is clear that both will coexist and that e-commerce will continue to grow.

Just like any other type of commerce, electronic commerce involves two parties: businesses and consumers. There are three basic types of electronic commerce:

- *Business-to-consumer (B2C)* involves the sale of a product or service to the general public or end users. Oftentimes this arrangement eliminates the wholesaler by allowing manufacturers to sell directly to customers. Other times, existing retail stores use B2C e-commerce to create a presence on the Web as another way to reach customers.

- *Consumer-to-consumer (C2C)* involves individuals selling to individuals. This often takes the form of an electronic version of the classified ads or an auction.

- *Business-to-business (B2B)* involves the sale of a product or service from one business to another. This is typically a manufacturer–supplier relationship. For example, a furniture manufacturer requires raw materials such as wood, paint, and varnish.

7. *Look through the text, find international words and translate them into Russian.*

8. *Concept check*

- A
1. What is electronic commerce?
 2. What are the three basic types of e-commerce?
 3. What are the three basic options for electronic payment?
- B
1. Speak on the topic of the rapid growth in e-commerce.
 2. Speak on the advantages and disadvantages of e-

commerce.

Use the following expressions to express your opinion

In my opinion, ...	It seems to me that ...
To my mind, ...	I have no doubt that ...
As far as I am concerned, ...	I am sure / I am certain that ...
From my point of view, ...	I think / consider / find / that ...
As for me / As to me, ...	I hold the opinion that ...
I would say that ...	It goes without saying that ...

9. Speak on the topic "E-commerce"

10. Practise reading the following words. Try to memorize them.

deposits – депозиты, вклады	through wire transfer – через банковский перевод
loans – кредитование	hypertext Markup Language (HTML) – Язык гипертекстовой разметки
e-banking – электронные банковские услуги	request – запрос
accounts – счета	account inquiry – учетная запись
transferring funds – перевод средств	responses – ответы
bill payment – оплата счетов	state-of-the-art imaging systems – современные системы обработки изображений
complement – дополнять	invoices – счета-фактуры
extra cost – дополнительная стоимость	to conduct – проводить
to be attracted by – привлекать	security threats – угрозы безопасности
to perform transaction – выполнять транзакцию	invasion – проникновение
rather than – а не, скорее чем	theft – кража
branch representative – представитель филиала	authentication – аутентификация
deposit rates – ставки по депозитам	firewalls – межсетевые экраны
fees – сборы	smart card – интеллектуальная карточка
to charge – устанавливать (цену)	waive – отказываться от
automated teller machine – банкомат	
withdraw – изымать	

11 Make up word-combinations with the following words and

memorize them

hypertext
transferring
to perform
security
smart
deposit
branch
account

rates
card
representative
markup language
inquiry
funds
transaction
threats

12. Give definitions to the following

1. a sum of money placed or kept in a bank account, usually to gain interest.
2. a method of banking in which the customer conducts transactions electronically via the Internet.
3. a record or statement of financial expenditure or receipts relating to a particular period or purpose.
4. a thing that completes or brings to perfection.

13. Translate the sentences into Russian. Ask special questions to the following statements.

1. Traditional banks offer many services to their customers.
2. E-banking uses the Internet to deliver traditional banking services to their customers, such as opening accounts, transferring funds, and electronic bill payment.
3. E-banking can be offered in two main ways.
4. Generally, e-banking is provided without extra cost to customers.
5. There are e-banks that exist only on the Internet, allowing users to work with a “virtual” bank.
6. E-banking services are delivered to customers through the Internet and the web using Hypertext Markup Language (HTML).

14. Read, translate and analyze the text.

E-banking

Traditional banks offer many services to their customers, including accepting customer money deposits, providing various banking services to customers, and making loans to individuals and

companies. Compared with traditional channels of offering banking services through physical branches, e-banking uses the Internet to deliver traditional banking services to their customers, such as opening accounts, transferring funds, and electronic bill payment.

E-banking can be offered in two main ways. *First*, an existing bank with physical offices can also establish an online site and offer e-banking services to its customers in addition to the regular channel.

E-banking this way complements the bank's physical presence. Generally, e-banking is provided without extra cost to customers. Customers are attracted by the convenience of e-banking through the Internet, and in turn, banks can operate more efficiently when customers perform transactions by themselves rather than going to a branch and dealing with a branch representative.

In addition to traditional banks that have both a physical and online presence, there are e-banks that exist only on the Internet, allowing users to work with a "virtual" bank. NetBank is such an Internet-only bank. Without physical branches, NetBank can cut operating costs and can potentially offer higher deposit rates to its customers and waive many fees normally charged by a bank with a large network of physical branches. The challenge for Internet-only banks is to provide quality customer services without physical offices. One way in which NetBank is dealing with this issue is via an agreement with the MAC ATM Network (automated teller machine network), thus providing its customers access to nearly 18,000 ATMs across the United States. NetBank customers can deposit and withdraw funds from their NetBank accounts through these ATMs, and in addition, customers can also deposit and receive funds through wire transfer. E-banking services are delivered to customers through the Internet and the web using Hypertext Markup Language (HTML).

In order to use e-banking services, customers need Internet access and web browser software. Multimedia information in HTML format from online banks can be displayed in web browsers. The heart of the e-banking application is the computer system, which includes web servers, database management systems, and web application programs that can generate dynamic HTML pages. Bank customers' account and transaction information is stored in a database, a specialized software that can store and process large amounts of data in high speed. The function of the web server is to interact with online

customers and deliver information to users through the Internet. When the web server receives a request such as an account inquiry from an online customer, it requires an external web application program to process the request. C, Visual Basic, VBScript, and Java are some of the languages that can be used to develop web application programs to process customer requests, interact with the database, and generate dynamic responses. Then, the web server will forward the response HTML files to e-banking customers. Several banks, such as NationsBank, also use state-of-the-art imaging systems, allowing customers to view images of checks and invoices over the Internet. One of the main concerns of e-banking is security. Without great confidence in security, customers are unwilling to use a public network, such as the Internet, to view their financial information online and conduct financial transactions. Some of the security threats include invasion of individuals' privacy and theft of confidential information. Banks with e-banking service offer several methods to ensure a high level of security: (1) identification and authentication, (2) encryption, and (3) *firewalls*. First, the identification of an online bank takes the form of a known Uniform Resource Locator (URL) or Internet address, while a customer is generally identified by his or her login ID and password to ensure only *authenticated* customers can access their accounts. Second, messages between customers and online banks are all *encrypted* so that a hacker cannot view the message even if the message is intercepted over the Internet. The particular encryption standard adopted by most browsers is called Secure Socket Layer (SSL). It is built in the web browser program and users do not have to take any extra steps to set up the program. Third, banks have built firewalls, which are software or hardware barriers between the corporate network and the external Internet, to protect the servers and bank databases from outside intruders. For example, Wells Fargo Bank connected to the Internet only after it had installed a firewall and made sure the firewall was sufficiently impenetrable. The range of e-banking services is likely to increase in the future. Some banks plan to introduce electronic money and electronic checks. Electronic money can be stored in computers or *smart cards* and consumers can use the electronic money to purchase small value items over the Internet. Electronic checks will look similar to paper checks, but they can be sent from buyers to sellers over the Internet,

electronically endorsed by the seller, and forwarded to the seller's bank for electronic collection from the buyer's bank. Further, banks seek to offer their customers more products and services such as insurance, mortgage, financial planning, and brokerage. This will not only deliver more value to the customers but also help banks to grow business and revenues.

Hypertext Markup Language (HTML) is an encoding scheme for text data that uses special tags in the text to signify properties to the viewing program (browser) like links to other documents or document parts.

Firewalls are special purpose network computers or software that are used to ensure that no access is permitted to a sub-network unless authenticated and authorized.

Authenticated means verifying that users are who they say they are and that they are allowed access to certain systems *encrypted* coded, usually for purposes of security or privacy.

Smart cards are credit-card style cards that have a microcomputer embedded within them; they carry more information to assist the owner or user.

15. Concept check. Ask your partner questions to the text

16. Make up a plan and speak on the topic "E-banking"

17. A. Write the words into the spaces below.

Internet banking

applications authentication encrypted facilities passwords
PINs protected transactions victims

a. Customers with facilities for Internet banking (also known as online banking) can use their bank's or building society's website to carry out payments and other 1 _____ over the Internet. This form of banking can be done outside business hours and from anywhere with Internet access. Features of Internet banking include payment of bills, funds transfers between a customer's own accounts, transfers to a third party's account, loan 2 _____ and viewing bank statements.

b. In addition to the Internet banking 3 _____ offered by high-street banks, a new generation of banks operate exclusively online. These banks tend to offer high interest rates on savings accounts and low rates on loans because their overheads are much lower than those of traditional banks.

c. Security has become a key issue in Internet banking. For most secure Internet sites, such as Internet shopping sites, single password 4 _____ is considered sufficient. In an increasing number of countries, this is no longer considered adequate for Internet banking. In these cases, entry to the site requires the input of one of a selection of passwords and multiple 5 _____.

All information is 6 _____, making it almost impossible for a third party (i.e. a hacker) to access the information.

d. However, hackers can gain access to inadequately 7 _____ home PCs, and can record the password as it is typed in (keylogging). Spyware and other malicious programs can record private banking details, and send them to a third party. A more commonplace danger is written passwords and PINs falling into the wrong hands.

e. Internet banking is perceived by some as being too vulnerable to fraud to consider using. However, the number of 8 _____ of Internet banking fraud is very small. Statistically, in fact, conventional banking activities carry a higher risk of fraud than Internet banking – simple credit card fraud and various forms of identity theft are far more widespread. It is far easier to obtain banking and other details by going through a bag of rubbish and collecting old bank statements etc. than it is to obtain it by hacking.

f. Generally speaking, unless users are careless or gullible, Internet banking does not carry a great level of risk. Nevertheless, criminals continue to come up with inventive ways to access accounts. An example is “phishing” – using emails purporting to be from the customer’s bank to persuade people to hand over their 9 _____.

B. Find words in the article which mean the same as the following.

1. money (*paragraph a*) _____

2. another person or company (*paragraph a*) _____

3. only (*paragraph b*) _____
4. business expenses (*paragraph b*) _____
5. more than one (*paragraph c*) _____
6. person who illegally access somebody else's computer (*paragraph c*) _____
7. a program which steals private information from a computer (*paragraph d*) _____
8. intended to do bad things (*paragraph d*) _____
9. financial crime (*paragraph e*) _____
10. stealing money by pretending to be somebody else (*paragraph e*)

11. common (*paragraph e*) _____
12. easily deceived / will believe anything (*paragraph f*) _____
13. pretending (*paragraph f*) _____
14. give (*paragraph f*) _____

C. Match the verbs with the nouns.

- | | |
|-------------------------------------|--------------------------|
| 1. access | a. a bill online |
| 2. carry | b. a password |
| 3. click on | c. a risk |
| 4. enter / input / key in / type in | d. an electronic payment |
| 5. fall into | e. an icon |
| 6. make | f. funds |
| 7. pay | g. the internet |
| 8. transfer | h. the wrong hands |

D. Match the words on the left with words on the right.

- | | |
|------------------------------|----------------------|
| 1. a high | a. business hours |
| 2. a low risk of | b. fraud |
| 3. an Internet-only | c. interest rates |
| 4. offer higher-than-average | d. level of security |
| 5. outside | e. savings account |
| 6. vulnerable | f. to fraud |

18. Speak on the topic "Internet banking"

UNIT 4. MONEY – THE BASICS

1. Repeat the following words after the teacher (minding stresses) and memorise them.

the means of payment –

средство платежа

medium of exchange – средство обращения

a standard of value – мера стоимости

a unit of account единица учета

a store of value средство сбережения (сохранения стоимости)

a standard of deferred payment

средство погашения долга

subsequently впоследствии

a barter economy бартерная экономика

to swap (to exchange, to barter)

обменивать, менять

to hand over in exchange

передать, вручить в обмен

token money символические деньги (дензнаки, жетоны, и т.п.)

to melt down расплавить

tiny costs мизерные затраты

to supplement дополнять

a double coincidence of wants

двойное совпадение потребностей

a monetary unit денежная единица

to remind of напоминать

to be worthless обесцениваться

an interest-bearing bank

account счет в банке с выплатой процентов

to pay interest приносить процентный доход

to erode эд. фактически уменьшаться

hard currency твердая (конвертируемая) валюта

soft currency неконвертируемая валюта

invariably неизменно, постоянно

commodity money деньги – товар

legal tender законное платежное средство

IOU money (I Owe You – я вам должен) деньги – долговое обязательство

a bank deposit вклад в банке

2. Read the following text.

Money and its functions

The main feature of money is its acceptance as the means of payment or medium of exchange. Nevertheless, money has other functions. It is a standard of value, a unit of account, a store of value

and a standard of deferred payment.

The Medium of Exchange

Money, the medium of exchange, is used in one-half of almost all exchange. Workers work for money. People buy and sell goods in exchange for money. We accept money not to consume it directly but because it can subsequently be used to buy things we wish to consume. Money is the medium through which people exchange goods and services.

In barter economy there is no medium of exchange. Goods are traded directly or swapped for other goods. In a barter economy, the seller and the buyer each must want something the other has to offer. Each person is simultaneously a seller and a buyer. There is a double coincidence of wants.

Trading is very expensive in a barter economy. People must spend a lot of time and effort finding others with whom they can make mutually satisfactory swaps. Since time and effort are scarce resources, a barter economy is wasteful.

Money is generally accepted in payment for goods, services, and debts and makes the trading process simpler and more efficient.

Other Functions of Money

Money can also serve as a standard of value. Society considers it convenient to use a monetary unit to determine relative costs of different goods and services. In this function money appears as the unit of account, is the unit in which prices are quoted and accounts are kept.

To be accepted in exchange, money has to be a store of value. Money is a store of value because it can be used to make purchases in the future.

Houses, stamp collections, and interest-bearing bank accounts all serve as stores of value. Since money pays no interest and its real purchasing power is eroded by inflation, there are almost certainly better ways to store value.

Finally, money serves as a standard of deferred payment or a unit of account over time. When you borrow, the amount to be repaid next year is measured in money value.

Different Kinds of Money

Golden coins are the examples of commodity money, because their gold content is a commodity.

A token money is a means of payment whose value or purchasing power as money greatly exceeds its cost of production or value in uses other than as money.

A \$10 note is worth far more as money than as a 3x6 inch piece of high-quality paper. Similarly, the monetary value of most coins exceeds the amount you would get by melting them down and selling off the metals they contain. By collectively agreeing to use token money, society economizes on the scarce resources required to produce money as a medium of exchange. Since the manufacturing costs are tiny, why doesn't everyone make \$10 notes? The essential condition for the survival of token money is the restriction of the right to supply it. Private production is illegal.

Society enforces the use of token money by making it legal tender. The law says it must be accepted as a means of payment. In modern economies, token money is supplemented by IOU money.

An IOU money is a medium of exchange based on the debt of a private firm or individual.

A bank deposit is IOU money because it is a debt of the bank. When you have a bank deposit the bank owes you money. You can write a cheque to yourself or a third party and the bank is obliged to pay whenever the cheque is presented. Bank deposits are a medium of exchange because they are generally accepted as payment.

3. Give Russian equivalents to the following:

1. exchange labour services for money
2. you must hand over in exchange a good or service
3. a double coincidence of wants
4. spend a lot of time and effort
5. make mutually satisfactory swap
6. a barter economy is wasteful;
7. commodity generally accepted in payment for goods
8. prices are quoted and accounts are kept
9. its purchasing power is eroded by inflation
10. it's usually but not invariably convenient
11. cut back on other uses
12. exceeds its cost of production
13. by collectively agreeing
14. the survival of token money

15. society enforces the use of token money
16. token money is supplemented by IOU money
17. interest-bearing bank accounts

4. *Replace the words in italics by synonyms:*

sometimes payment can be *put off till later*,

the *vital* feature of money;

its purchasing power is *worn away*,

the money is *without value*,

it is not *always* convenient;

time and effort are *rare* resources;

private production of money is *against the law*

5. *Find in the text English equivalents for the following*

1. средство платежа
2. средство обращения
3. мера стоимости
4. средство сбережения
5. единица учета
6. средство погашения долга
7. в обмен на
8. может быть впоследствии использовано
9. обмениваться товарами и услугами
10. бартерная экономика
11. измеряться
12. обесцененный
13. платить проценты
14. покупательная способность
15. промышленное использование
16. потребительское использование
17. деньги – товар
18. денежные знаки (символические деньги)
19. денежная стоимость
20. ограничение права
21. вклад в банке
22. банковская ссуда
23. законное платежное средство
24. долговое обязательство

6. *Answer the questions:*

1. Why do people accept money?
2. What are the functions of money?
3. What are different kinds of money?
4. What's a barter economy?
5. What does IOU stand for?

7. *Translate into English:*

Существует несколько функций денег. Во-первых и прежде всего, деньги являются средством платежа, или обращения; деньги можно использовать при покупке и продаже товаров и услуг. Деньги выступают также мерой стоимости. Общество считает удобным использовать денежную единицу в качестве масштаба для соизмерения относительных стоимостей различных благ и ресурсов.

Деньги служат средством сбережения. Поскольку деньги являются наиболее ликвидным товаром, то есть таким, который можно без проблем продать (обменять), то они являются очень удобной формой хранения богатства. Это, однако, не единственная форма хранения богатства. Во время упадка в экономике, при высокой инфляции и обесценении денег, население, скорее всего, будет хранить богатство в виде недвижимости или других дорогостоящих товаров – предметах искусства, драгоценностях.

Деньги, которые, являются долговыми обязательствами государства, коммерческих банков и сберегательных учреждений, имеют стоимость благодаря товарам и услугам, которые приобретаются за них на рынке.

8. *Translate the text using a dictionary.*

Money as a medium of exchange

Money is a medium of exchange in economy. It is a means of payment for goods and services and in settlement of debts. Money is also a standard of value for measuring the relative economic worth of different goods and services. The price of the commodity is the number of units of money required to buy this commodity. The main functions of money are a medium of exchange and the measure of value. Without the use of money, trade would be reduced to barter,

that is to direct exchange of one commodity for another. Barter trade was the means used by primitive peoples, and it is still practised in some parts of the world. In a barter economy, a person having something to trade must find another who wants it and has something acceptable to offer in exchange. In a money economy, the owner of a commodity may sell it for money and buy anything he wants for this money. So money may be regarded as a keystone of modern economic life.

Types of Money

The most important types of money are commodity money, credit money, and fiat money. The value of commodity money is about equal to the value of the material contained in it. The principal materials used for this type of money have been gold, silver, and copper. Credit money are documents with promises by the issuer to pay an equivalent value in the standard monetary metal. Fiat money is paper money the value of which is fixed by government. Most minor coins in circulation are also a form of fiat money, because the value of the material of which they are made is usually less than their value as money.

Both the fiat and credit forms of money are generally made acceptable through a government decree that all creditors must take the money in settlement of debts. Fiat money in the form of banknotes is referred to as legal tender.

Banknotes are usually made from special high-quality paper, with watermarks, metallic strips, and other features against forgery. Highly sophisticated printing techniques are used, and banknote designs have elements that are hard to copy. Fronts and backs of notes are printed separately, and serial numbers are added later.

UNIT 5 SUPPLEMENTARY READING

To Unit 1

1. Read the text and find Russian equivalents to the underlined words and phrases.

Subdivisions of the field

Basic cybernetics

Cybernetics studies systems of control as a concept, attempting to discover the basic principles underlying such things as artificial intelligence, computer vision, control systems, conversation theory, emergence, interactions of actors theory, learning organization, robotics, second-order cybernetics, self-organization in cybernetics.

In biology

Cybernetics in biology is the study of cybernetic systems present in biological organisms, primarily focusing on how animals adapt to their environment, and how information in the form of genes is passed from generation to generation.^[22] There is also a secondary focus on combining artificial systems with biological systems.

- Autopoiesis
- Biocybernetics
- Bioengineering
- Bionics
- Ecology
- Heterostasis
- Homeostasis
- Medical cybernetics
- Neuroscience
- Practopoiesis
- Synthetic biology
- Systems biology

In computer science

Computer science directly applies the concepts of cybernetics to the control of devices and the analysis of information.

- Cellular automaton
- Decision support systems

- Design patterns
- Robotics
- Simulation

In engineering

Cybernetics in engineering is used to analyze cascading failures and system accidents, in which the small errors and imperfections in a system can generate disasters. Other topics studied include:

- Adaptive systems
- Biomedical engineering
- Engineering cybernetics
- Ergonomics
- Systems engineering

In management

- Autonomous agency theory
- Entrepreneurial cybernetics
- Management cybernetics
- Operations research
- Organizational cybernetics
- Systems engineering
- Viable system theory

In mathematics

Mathematical Cybernetics focuses on the factors of information, interaction of parts in systems, and the structure of systems.

- Control theory
- Dynamical system
- Information theory
- Systems theory

2. Translate the text of Task 1 and discuss the concepts applicable to your future profession.

To Unit 2

3. Practice reading the following special subjects.

математический анализ	mathematical analysis
геометрия и алгебра	algebra and geometry
ЭВМ и программирование	computer and programming
введение в специальность	introduction to economical cybernetics
экономическая теория	economics
дискретная математика	discrete mathematics
обыкновенные дифференциальные уравнения	common differential equations
матричный анализ	matrix analysis
вычислительные методы алгебры	computational approaches (calculation methods) of algebra
функциональный анализ и интегральные уравнения	functional analysis and integral equations
теория вероятностей и математическая статистика	probability theory and mathematical statistics
теория алгоритмов	theory of algorithms
модели микро- и макроэкономики	micro- and macroeconomic models
основы приватизации	privatization fundamentals
дифференциальные уравнения с частными производными	differential equations with partial derivatives
компьютерные сети	computer networks
модели данных и СУБД	data models and DBMS
методы численного анализа	methods of numerical analysis
методы оптимизации	optimization methods
ЭММ управления производством	economico-mathematical methods of production control
исследование операций	operational research (operations research) (<i>научная дисциплина – раздел системного анализа</i>)
имитационное и статистическое моделирование	simulation and statistical modeling

<p>основы экономического анализа и бухучета модели финансово-экономического управления математическая экономика эконометрика</p>	<p>economic analysis and accounting fundamentals finance and economic management models mathematical economic theory econometrics (<i>одна из относительно новых отраслей экономики; применяет методы математики и статистики для тестирования экономических теорий</i>)</p>
<p>охрана труда делопроизводство</p>	<p>protection of labour office work (<i>делопроизводство, канцелярская [конторская] работа (ведение документации, т. е. прием, заполнение, оформление, отправка документов, учет и контроль за их движением и исполнением, обновление документов)</i>)</p>
<p>инвестиционное проектирование управление интеллектуальной собственностью модели финансового рынка оптимизация решений в экономике и бизнесе математическая теория финансового риска</p>	<p>investment planning intellectual property management financial market models decision optimization in economics and business mathematical theory of financial risk</p>

4. Read the text, translate it and discuss its contents in teams.

History

Economic cybernetics is still in the formative stage. In many countries such investigations are still included under systems analysis, operations research, and management science, as in the United States and Great Britain, or under information science, as in France. The

term “economic cybernetics” was first used in the early 1960s by V.S. Nemchinov (former USSR), O. Lange and H. Greniewski (Poland), and S. Beer (Great Britain). These scientists also sketched the main lines of development of the new science, devoting special attention to the connection between systems analysis of an economy on the one hand and logic, control theory, and information theory on the other. Many fundamental propositions of economic cybernetics were formulated much earlier, however. The notion of an economy as a system is contained in F. Quesnay’s Economic Table (1758). It was elaborated and scientifically substantiated in the works of K. Marx and V.I. Lenin.

In the 1950s and 1960s special attention was devoted to applied questions of building data-processing systems. These questions included study and streamlining of data flows, coding, and organization of data processing. Through these investigations, computers could be used more efficiently in data-processing systems; previously they had been used for one-time calculations and had not been employed on the control level. Diagrams for the regulation of economic systems, somewhat really abstract, were constructed as illustrations of the theory of automatic control.

All these investigations, which at first were very weakly interrelated, gradually came together to make up the problem area of economic cybernetics. As the transition was made from comparatively small-scale data-processing systems at enterprises and firms to analysis and planning information systems on the sectorial and national level, the common features of the field emerged. In this case, information flows and data processing could no longer be considered apart from the processes of planning and controlling the economy as a whole. The question of information supply for large-scale systems of mathematical economic models became especially urgent. Solution of the central problem of combining models of objects being controlled and models of control processes became the basis for planning automated control systems. With the solution of this problem, efficient and optimal plans that meet the set requirements of the controlling body could be developed and implemented to create an optimal control system.

To Unit 4

1. Read the text, translate it and discuss its contents in teams.

Bitcoin is a new currency that was created in 2009 by an unknown person using the alias Satoshi Nakamoto. Transactions are made with no middle men – meaning, no banks! There are no transaction fees and no need to give your real name. More merchants are beginning to accept them: You can buy webhosting services, pizza or even manicures.

Bitcoins can be used to buy merchandise anonymously. In addition, international payments are easy and cheap because bitcoins are not tied to any country or subject to regulation. Small businesses may like them because there are no credit card fees. Some people just buy bitcoins as an investment, hoping that they'll go up in value.

Several marketplaces called “bitcoin exchanges” allow people to buy or sell bitcoins using different currencies. Mt. Gox is the largest bitcoin exchange.

People can send bitcoins to each other using mobile apps or their computers. It's similar to sending cash digitally.

People compete to “mine” bitcoins using computers to solve complex math puzzles. This is how bitcoins are created. Currently, a winner is rewarded with 25 bitcoins roughly every 10 minutes.

Bitcoins are stored in a “digital wallet,” which exists either in the cloud or on a user's computer. The wallet is a kind of virtual bank account that allows users to send or receive bitcoins, pay for goods or save their money. Unlike bank accounts, bitcoin wallets are not insured by the FDIC.

Wallet in cloud: Servers have been hacked. Companies have fled with clients' Bitcoins.

Wallet on computer: You can accidentally delete them. Viruses could destroy them.

Though each bitcoin transaction is recorded in a public log, names of buyers and sellers are never revealed – only their wallet IDs. While that keeps bitcoin users' transactions private, it also lets them buy or sell anything without easily tracing it back to them. That's why it has become the currency of choice for people online buying drugs or other illicit activities.

Future in question

No one knows what will become of bitcoin. It is mostly unregulated, but that could change. Governments are concerned about taxation and their lack of control over the currency.

2. Analyze the following information. Be ready to express your opinion. While discussing the text, use such phrases as

In my opinion, ...

To my mind, ...

As far as I am concerned, ...

From my point of view, ...

As for me / As to me, ...

I would say that ...

Bitcoin is just like all other digital currencies; nothing new

Nearly all other digital currencies are centrally controlled. This means that:

- They can be printed at the subjective whims of the controllers
- They can be destroyed by attacking the central point of control
- Arbitrary rules can be imposed upon their users by the controllers

Being decentralized, Bitcoin solves all of these problems.

Bitcoins don't solve any problems that fiat currency and/or gold doesn't solve

Unlike gold, bitcoins are:

- Easy to transfer
- Easy to secure
- Easy to verify
- Easy to granulate

Unlike fiat currencies, bitcoins are:

- Predictable and limited in supply
- Not controlled by a central authority (such as The United States Federal Reserve)
- Not debt-based

Unlike electronic fiat currency systems, bitcoins are:

- Potentially anonymous
- Freeze-proof
- Faster to transfer
- Cheaper to transfer

Miners, developers or some other entity could change Bitcoin's properties to benefit themselves

Bitcoin's properties cannot be illegitimately changed as long as most of bitcoin's economy uses full node wallets. Transactions are irreversible and uncensorable as long as no single coalition of miners has more than 50% hash power and the transactions have an appropriate number of confirmations.

Bitcoin requires certain properties to be enforced for it to be a good form of money, for example:

1. Nobody ever created money out of nothing (except for miners, and only according to a well-defined schedule).
2. Nobody ever spent coins without knowing their private key.
3. Nobody spent the same coin twice
4. Nobody violated any of the other tricky rules that are needed to make the system work (difficulty, proof of work, DoS protection, ...).

These rules *define* bitcoin. A full node is software that verifies the rules of bitcoin. Any transaction which breaks these rules is not a valid bitcoin transaction and would be rejected in the same way that a careful goldsmith rejects fool's gold.

Full node wallets should be used by any intermediate bitcoin user or above and especially bitcoin businesses. Therefore anybody attempting to create bitcoins with invalid properties will find themselves being rejected by any trading partners. Note that lightweight wallets and web wallets do not have the low-trust benefits of full node wallets. Lightweight (SPV) wallets will blindly trust the miners, meaning if 51% of miners printed infinite coins or spent the same coin twice then lightweight wallet users would happily accept these fake bitcoins as payment. Web wallets blindly trust the web server which could display anything at all.

Miners are required to choose between multiple *valid* transaction histories. A coalition of more than 50% of miner power is able to (at great expense to themselves) rewrite transaction history, so miner

decentralization is necessary to keep transactions irreversible. Miners burn a lot of electrical power in the mining process so they must constantly be trading their bitcoin income in order to pay bills. This makes miners utterly dependent on the bitcoin economy at large and therefore gives them a strong incentive to mine *valid* bitcoin blocks that full nodes will accept as payment.

Influential figures in the community (such as developers, politicians or investors) may try to use their influence to convince people to download and run modified full node software which changes bitcoin's properties in illegitimate ways. This is unlikely to succeed as long as counterarguments can freely spread through the media, internet forums and chatrooms. Many bitcoin users do not follow the bitcoin forums on a regular basis or even speak English. All appeals to run alternative software should be looked at critically for whether the individual agrees with the changes being proposed. Full node software should always be open source so any programmer can examine the changes for themselves. Because of the co-ordination problem, there is usually a strong incentive to stick with the status quo.

ЛИТЕРАТУРА

1. Агабекян И.П., Коваленко П.И. Английский язык для экономистов. Издание 4-е. Серия «Высшее образование». Ростов н/Д : «Феникс», 2004 – 416 с.
2. Novikov D.A. Cybernetics: From Past to Future. – Heidelberg: Springer, 2016. – 107 p.
3. Современный англо-русский словарь компьютерных технологий. - М.: Бук-пресс, 2006. - 528 с.
4. O’Leary, T.J. Computing Essentials : Making IT Work for you / T.J. O’Leary, L.I. O’Leary. – Arizona State University, 2012. – 544 p.

Учебное издание

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АНГЛИЙСКИЙ ЯЗЫК

ECONOMIC CYBERNETICS

ПРАКТИЧЕСКОЕ ПОСОБИЕ

для студентов специальности 1-31 03 06-01
«Экономическая кибернетика (математические методы и
компьютерное моделирование в экономике)»

Лицензия №02330/0133208 от 30.04.04.

Подписано в печать . .11. Формат 60x84 1/16.

Бумага писчая №1. Гарнитура «Таймс». Усл.п.л. , .

Уч.-изд.л. , . Тираж экз. Заказ № .

Отпечатано с оригинала-макета на ризографе
учреждения образования
«Гомельский государственный университет
имени Франциска Скорины».
Лиц №02330/0056611 от 16.04.04.
246019, г. Гомель, ул. Советская, 104.