ALGORITHM SUPPORT FOR COMPUTERIZED MANAGEMENT SYSTEM

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Abstract

Software- set of mathematical methods, and algorithms of information processing, which used in creating the computerized management system (CMS). Initial data for the design of CMS software system is a list of functional task includes the task and function of computer aid design (CAD), computerized enterprise management system, and others.

Material and methods: The method was most widely used. Most algorithms in computerized management systems are computerized (solving problem modeling, control, accounting, planning, and others). Many of them implement various mathematical methods (management solution, and others).In this study, two algorithms were used to evaluate mathematical expression, after which the result was compared in both cases.

Results: As looking, this paper shows the created algorithm which needs for the development of the program support for computerized management system.

Keywords: Computerized, management system, Algorithm support, System development, Method, Function, Task

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Introduction

Software- set of mathematical methods, and algorithms of information processing, which used in creating the computerized management system (CMS). Initial data for the design of CMS software system is a list of functional task includes the task and function of Computer Aided Design (CAD), computerized enterprise management system, etc.In this way, a part of software of ICMS including mathematical

methods, and means allows us to solve all given tasks. The structure of the software of ICMS is shown in Figure (1).

Task set in computerized management systems (CMS) beginning with the task of regulating technological process and completing the task and long–term planning of the enterprise as a whole, provides computerized of all system functions. In the process of setting the task, sequence of information processing steps is determined, that is the solution algorithms.

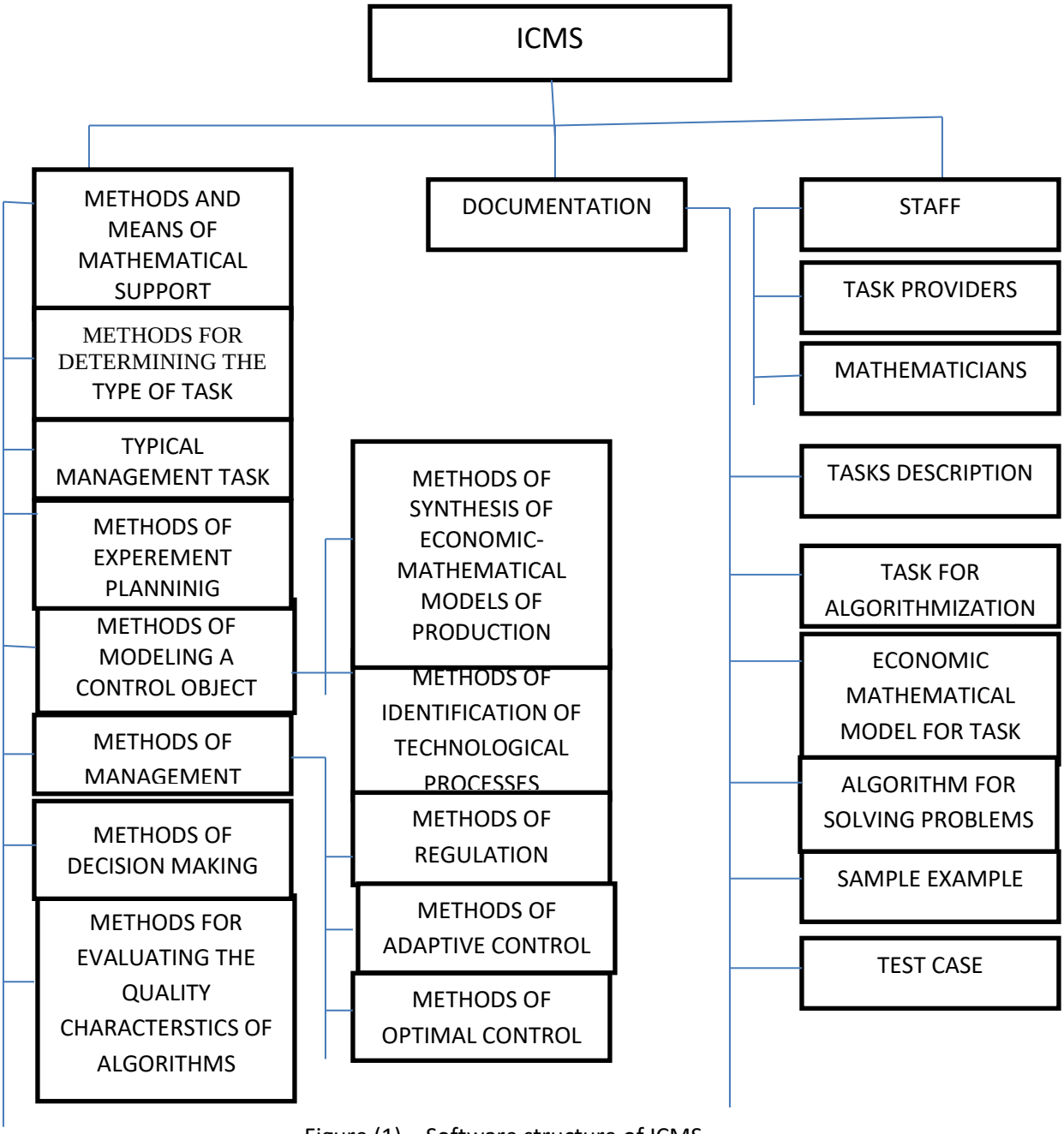


Figure (1) – Software structure of ICMS.

Features and properties of algorithms for CMS. Development of algorithms for CMS is the creation of information process, allowing to effectively managing this object in accordance with the goal, and the management process is best seen as a series of tasks relatedto each

other and cause of the conditioned mathematical and logical operations.

The work on creating algorithms for information management systems is divided into the following listed types:

a) Selection and development of algorithms in the systems;
b) Development of a method for organizing data in the system; and
c) Development of ways of interaction of administrative and management personnel with management algorithms to the system.

The development of algorithms takes the leading place in the problem of creating CMS.

Formally, the algorithm is defined as a constructively defined correspondence between words and abstract alphabet, by which is understood any but necessarily finite collection of some objects of the letters of the alphabet. Letters of alphabet can be letters of natural language, geometric figures, or special characters. A finite ordered sequence of letters of the alphabet forms a word. An alphabetic operator can fully assigns a correspondence between words in abstract alphabet and can be described by the correspondence table, which in the simplest case has the form.

Operator	**Word in the definition of this operator**	**The result of this operator**

If the domain of definition of the operator is infinite and in the form of a table, it cannot de described, then it is set by the system of rules. By using the rules system, you can find the output words for a finite number of steps corresponding to any input word.

In this way, algorithm is a collection of prescribed or a system of rules, determining the process of converting the initial data into desired result in a finite number of steps. The control algorithm determines the nature of the control's operation on the control object, the goal is to achieve this goal.

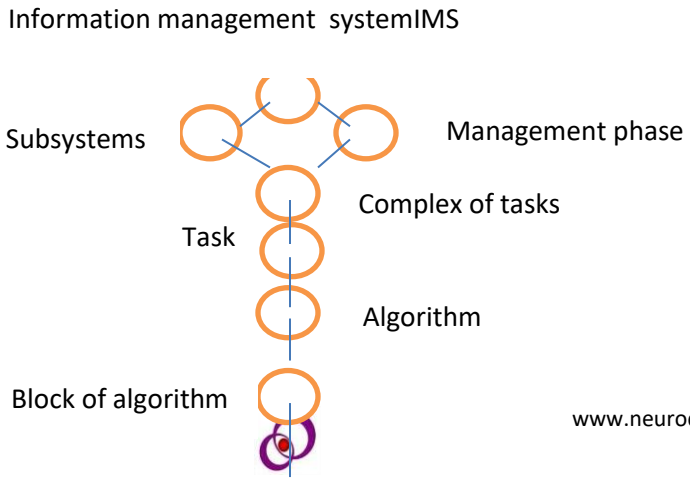
The components of the algorithm are:

a) Block: separate, relatively independent change algorithm;
b) Operator: elementary structural part of the algorithm.

Set of algorithms (separate algorithm) forms the task, determined by following factors:

- Convenience of generated initial data or output documents;
- Organization of data processing;
- Unity of computational procedures.

The algorithm of the problem must reflect the logic of its solution and ways of generating output data. Task group, united by the commonality of information and software forms a complex. Complex of management tasks, possessing a functional unity, the form a subsystem of information management system. Hierarchy of algorithmic elements of information management system presented in figure (2).



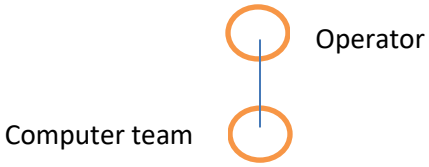


Figure (2):Hierarchy of algorithmic elements of information management system.

Three fundamental properties determine any algorithm:

1. Determinism of the algorithm, that is inadmissibility of arbitrary interpretation, elimination of an uncertain situation;
2. Mass character – property of the algorithm will be an application for a set of input data;
3. Effectiveness (direction) – algorithm properties, providing a result formally valid source data in a finite number of steps.

These properties of the algorithm are the basis for implementing in on the computer. Any algorithm includes the following elements:

- Set of possible initial data and result;
- Rules for the beginning of the algorithm, end of algorithm direct processing, retrieving the result.

Parameters of the algorithm from the point of view of its implementation are:

a) Required recourse of computer time;
b) Required memory at different levels.

Algorithms of information management system has some features, which distinguish them from the algorithms of scientific and technical calculation:

I. Together there have the properties of large systems, when does the quantitative complexity of systems become quality;
II. Algorithms problem in information management systems have a close information and functional relationship;
III. The same algorithm can be adopt in a variety of modes of operation of the system: batch processing, time sharing, dialog;
IV. They are usually associated with the processing of large amounts of information and a lot of computing operations;
V. The predominance of the operation of input – output over the other types of operation, in this connection, they require a data exchange practical with all external devices of the computer (direct access memory);
VI. omplex use of various means of implementing algorithms on a computer, such as algorithmic languages of different levels, application software packages, and so on.

The problem and solution:

The algorithm is understood as the set of prospection systems of rules, determining the process of converting the initial data into finite number of steps. There are different ways of writing algorithms: textual, mathematical, tabular, and graphical. The method was most widely used. Most algorithms in CMS are computerized (solving problem modeling, control, accounting, planning, and others). Many of them implement various mathematical methods (management solution, and others). Evidently, each method can be implemented by algorithms. An example of evaluating an expression

$$S = \sum_{t=1}^{n} f(x) f(t+1) \quad (1)$$

Two different algorithms are shown in the figure (3).

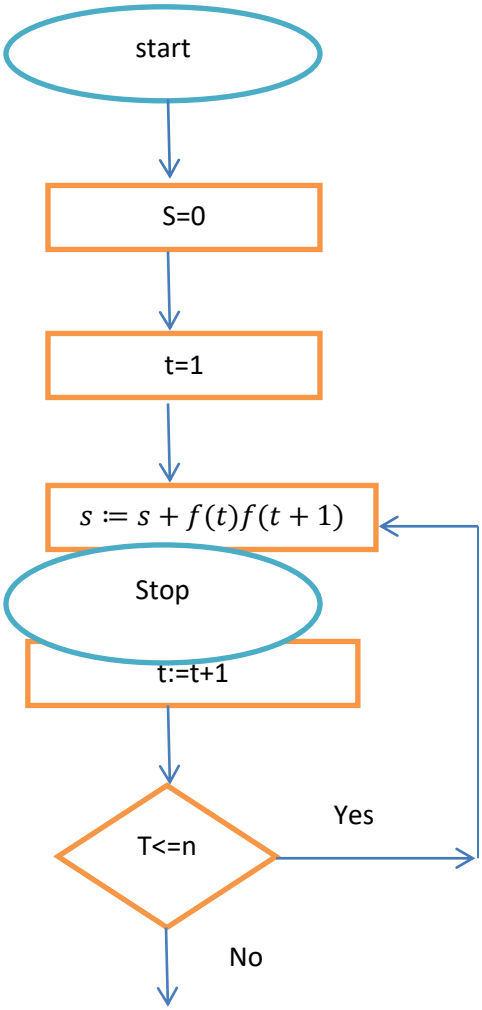


Figure (3, a) - Algorithm for evaluation an expression (1)

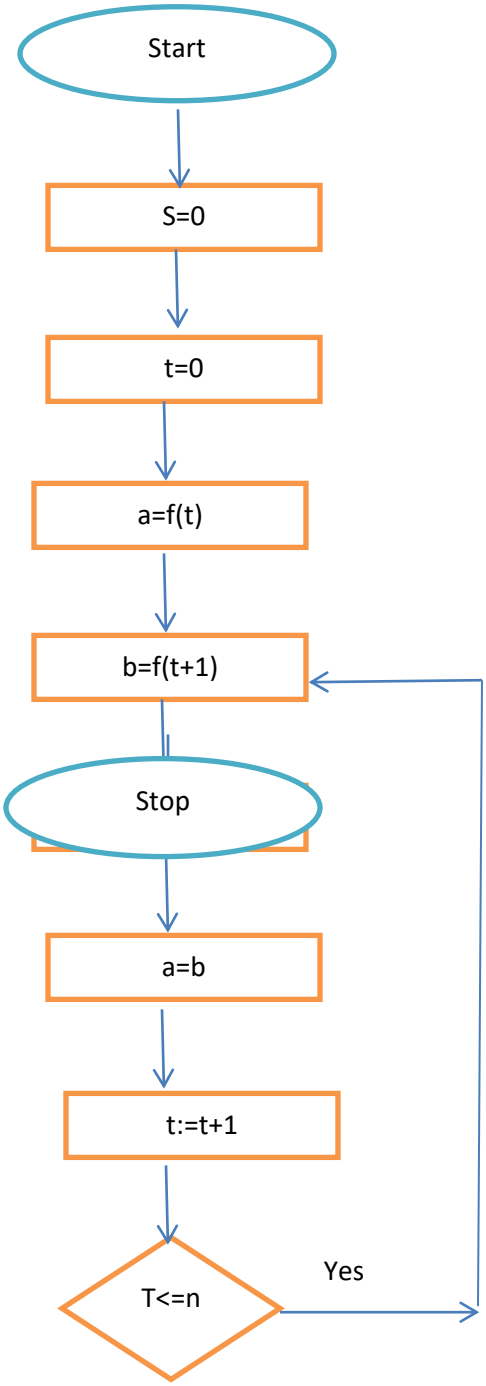


Figure (3, b) - Algorithm for ev an expression (1)

In figure (2) used of designation:
:= - sign assign a value;
+ : sign of positive decision. There is a difference between the above algorithm are the number function evaluations f(t).
In calculated 2n, in algorithm (b) n+1 if the function is difficult and great, time costs for implementing the algorithm (a) it will be much larger, than algorithm (b). Because the development of algorithm creative process, the effectiveness of which depends on the designer, the concept of algorithmic support is introduced algorithmic support of ccs. The difficulty of creating algorithms in an computerized management system is related to need to meet such conflicting requirement, how to increase the accuracy and reduce the complexity of the algorithm, reduction of the time of the solution of the problem and reducing the amount of memory, used to solve it, and other, which determine the featured of production and the capabilities of technical means.
In the process of design and algorithmic support of CMS, it is necessary to have apparatus (or method) comparing alternative solutions. To this end, for the comparison of algorithms, the introduction of concepts is complex, accuracy of the algorithm, the cost of its implementation and other. However, a single formal apparatus for comparing algorithms has not yet been created.
Algorithms, which used in CMS, very diverse and have some specific features, together they have the properties of large systems; when does the quantities complexity of the system become its quality; have a close information and functional relationship.
The same algorithm can be adopted in varies modes of operation of the system, batch process, time sharing online; associated with its processing of large amount of information and a large number of computational operations; I/O operations prevail.
In this connection, they require the exchange of data by practical with external devices of IBM (memorable channels of communication and others) complex used a variety of means to implement algorithms of IBM such as algorithmic language are different levels, package of application programs and others.
The process algorithm of the task in computerized management system it has many types iterative, he suggests selection of possible operators of algorithms; record the content of the action of each of the operators; establishment of the order of their implementation.
Algorithm development, its computing scheme, is realized by sequence of such stages:

1. Description of the general plan of the algorithm;
2. Formalization of the task;
3. Development of a generalized algorithm scheme;
4. Development of the structure of individual blocks;
5. Determining the possibility of using standard blocks;
6. Development of logical control unit for the correctness of algorithms work;
7. Optimization algorithms;
8. Specification of information characteristics;
9. Evaluation of the cost of resource machines for the implementation of the algorithm.

After completing the above steps, a document describing the algorithm is documented, this contains the following sections:

- Purpose and characteristic;
- Used information;
- Results of the decision,
- Mathematical description;
- Algorithm for solving;
- Test case requirements.

This document is the starting point for program support development.

Results:

Software- set of mathematical methods, and algorithms of information processing, which used in creating the computerized management system. Initial data for the design of CMS software system is a list of functional task includes the task and function of computer aid

design (CAD), computerized enterprise management system, and others.

As looking, this paper shows the created algorithm which needs for the development of the program support for computerized management system.

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