Materials of conference

CARRYING CAPACITY LIMITER OF THE ELECTRIC CRANE

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Reliability and safety of load-lifting cranes of the bridge type which has especially fulfilled normative service life are substantially defined by a level of their equipment devices and devices of safety, major of which are carrying capacity limiters and parameters registrars of work of the crane.

Now for used in the industry noncontrollable crane asynchronous electric drives development of the carrying capacity limiters with use of modern programmed microcontrollers and indirect methods of measurement of weight of a lifted cargo is perspective on the basis of informative parameters of the asynchronous motor.

The mathematical model of the electric drive of the mechanism of rise has been developed. The opportunity of realization of the carrying capacity limiter for cranes of bridge type with use of an indirect method of measurement of cargo weight is proved on mathematical model and by experimental researchs. The informative parameter is revealed and experimentally confirmed (rotation frequency n) with which help it is possible with sufficient accuracy to determine weight m of lifted cargo on linear function or consisting of linear pieces to the characteristic $n=f(m)$ which enter in memory of the microcontroller directly on the crane, allows to take into account its specific features, such as transfer number of the mechanism, frequency rate of tackle, efficiency of the mechanism, etc. The mathematical model of the mechanism of rise of the electric crane and the carrying capacity limiter is developed and researches of their teamwork are carried out. The way of definition of rotation speed of the motor on vibration diagrams of the stator frame of motor without the speed sensor is offered and checked experimentally up, allowing to determine with sufficient accuracy rotation frequency of the motor and to calculate weight of a lifted cargo.

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PRINCIPAL AND SPECIFIC FEATURES OF DEVELOPMENT OF INTELLECTUAL AND INFORMATION SYSTEMS FOR SELECTION AND INTRODUCTION OF RENEWED ENERGY SOURCES

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The constant reduction of mineral and raw materials resources, as well as growing negative effects such as heat, chemical and radioactive contamination of environment in combination with quick reduction of easy accessible fuel deposits, put the question of great increase the usage of the renewed energy sources (RES). RES are sources of types of energy, which are getting continuously renewed in earth biosphere such as solar, ocean, wind, river hydro power and geothermal energy. RES are clean from ecological point of view and do not create additional heating of the planet (so they are often called non-supplementary).The Studies in the field of RES have intensive development. Are they Currently Significant knowledge and experience are accumulated by now in connection with introduction of these energy technologies. At the same time, there is no practically information and economic foundation in view of modern information systems, which are based on knowledge that allows to choose efficiently, design and introduce RES. The Systems, which essential principal is base of knowledge or a model of the application domain and described by super high level language that is approximated to natural, are named intellectual systems (IS). The most typical representative IS are an expert systems (ES) and ontologies. ES is IS, which is oriented at spreading out the experience of highly trained specialists in areas, where quality of decision making traditionally depends on level of the expertise. The Ontologies are knowledge bases, which can "be read" and be understood, estranged from developer and / or physically divided by their users.The Principle difference of ES kernel and knowledge base (KB) from ontology is: in that that in ontologies contents and structure of KB are specified explicitly in ontoligies, but in KB of ES - no. The Development of knowledge base both in ES, and in ontology includes conceptualization, formalization and realization. Conceptualization provides the structuring of the subject knowledge in the manner of field of the knowledge in ES and meaningful explicit model in ontology. Formalization transforms the conceptual model in formal or "computing". Finally, in process of the realization

formal model is being programmed in corresponding language of the presentation of the knowledge.Specifics of the subject knowledge on renewed source is presented by four heterogeneous components at least, which are bound between themselves to one or another extent:

-A - technical;
-B - natural-ecological;
- C - engineering-geological;
- D - economic.

For each of four formulated aspects of presentation of the knowledge, conceptualization comes to:

- building of glossary terms;
- building of classification tree of notion;
- building of binary relations diagram.

And then, dictionary of concepts, plural attribute copies and classes, as well as included trees of categorization are built for each classification tree.

Following relations between dictionary concepts could be distinguished. They are such as:

- kind_of;
- part_of;
- has;
- is_a;
- see_also and others.

The Last of given relations are being entered not declaratively, but procedurally in analogy with programming languages, supporting abstract types data.

As our studies show, a dictionary of concepts per each chosen component (A, B, C, D) contains about 1000 notions. The Typical example attribute notion in classification and included trees are following: power, developer, manufacturer, cost, completing, average month and annual wind velocity, average number of sunny days in a year, etc.

At stage of formalization, it is necessary to select the most identical classification model for presentation and processing of obtained data. As it is shown in [1], the semantic networks under frames, rule-oriented model and model of the inductive generalization are being referred to the most typical representative of such formalisms, and possible, their mixed interpretation.

Let us illustrate the reviewed stage on example of the frame-based model. We shall remind that frame is a minimum possible description of essence of some notion, event, phenomena, situation, process or object.The Frame has nearly uniform structure and consists of standard units, named slot.

Exists several ways of the reception by slot the knowledge in exoframe: by default from protoframe (default - a knowledge), through subsequent characteristic from frame, specified in slot A_kind_of, per formula, specified in slot, through joined procedure, obviously from dialogue with user (the expert) and, finally, from database. As its seen in given diagram, the most important characteristic of frame-based model is a study of features of AKO (A_kind_of) relationship.

Thereby, frame-based model, for our application domain, for component A and B particularly and C possibly, is most suitable since it supports the hierarchy inherent to classifying and including tree, which is obtained at the stage of conceptualization.

Availability of evident procedural knowledge in description of the application domain (the component D and partially component C), points out that in this case it is better to use the rule-oriented formalism, under which operational memory of program is presented by two areas - an area of facts and area of the rules - strictly product. And methods of the work with these areas is being realized on principle "identification - an action" [1].

The Recommendations on inductive generalization model use are formulated by the author in [1].

The Last stage in chain considered is a stage of the programming. Here we shall note that for programming at a level of frame-based model in semantic set, it is reasonable to use such languages as FRL, KRL or Karre frame based shell. In the event of rule-oriented model, languages of the OPS-5 group are used. And, finally, for all three models it is possible to use the object-oriented programming languages.

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NEW APPROACHES TO STUDYING SILICON MELT CRYSTALLIZATION PRINCIPLES

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The severization of requirements at the consuming end (producers of organic silicon compounds and semiconductor products) to the quality of silicon obtained at silica-containing batch materials melting process in arc furnaces makes it nec-