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CONSTRUCTIONAL DESIGN AS AN ALGORITHM OF OBJECT DEVELOPMENT TRACK SYSTEM

According to the studies there is a relationship between functioning, structure and properties of the object, which is reflected in the laws, theoretical expressions of cyclically-modular approach, a new conceptual model of the object and the design environment architecture. Based on established stages of a new machine creation, object model and the design environment architecture, the design process can be represented as an algorithm of object development track system, which forms its properties. This algorithm can be described as a process of creating the layers of the object and the order of their performance, which is determined by directivity of the development (from concept to construction design). Actions to form the object are performed by the developer.

The content of carried out actions and sequence of their implementation are determined by this algorithm. Formation of the object is carried out layer-by-layer. The actions and sequence of their implementation within the layer are also defined by this algorithm. This provides a complete and correct result - ready layer of an object. Readiness of a layer can be checked by state of an object comparison with the layer readiness criteria. The fact of readiness starts the next phase of the object development - the formation of the next layer. Upon that invariant of the object and all received properties comprise the basis for the next layer. Since the beginning of each layer formation activates some part of design environment, corresponding to the created set of properties. For example, the transition from structural layer to schematic layer activates the library of graphic symbols, reflecting possible formal means for the process completion. Algorithm of object development track system also supports the establishment and development of modules as a part of the object.

Each cycle services individual layer of the model that reflects particular state of the object. Startup of the algorithm is initiated by requirements for the object with a specified set of properties. Then form a description of the object and a set of requirements to it. After that the initial cycle is launched. This cycle corresponds to the process of core formation – selection of the principle of operation of the object. Selected principle initiates a transition to the next cycle - description of features of the object. The layer is believed to be formed when functional scheme of operation of the object is done. The next cycle - structure formation process of implementation of the functions. The layer is believed to be formed when the process of the object functioning is described in detail; it meets the requirements to its logical and structural adequacy. In the next cycle on the structural basis is formed the circuit diagram. The performance of the following cycle enables the formation of mathematical model of the object, based on the structure of functioning process and on the concept scheme. Next, it is essential to determine elements' parameter data, provide the required object performance parameters. Simulation of the processes in the object is used for this purpose. In the next cycle the design of the object is formed according to the algorithm.

The design has the object with a specified set of properties. The created object ensures the meeting of needs which caused the process of its design. Application of the cycle sequence and changing method during transitions between the layers makes it possible to preserve the same structure of the process of the object functioning at all stages of the design and reduce the number of iterations. Due to the offered approach can be obtained a design object with a set of desired properties and exploitation features in the short time period. Model of the object, the algorithm and cyclically-modular approach have the following features: application of laws of the relationship between functioning, structure and properties of the object; provision of structural and logical adequacy of the model at the stage of its construction; provision of coherence between stages and modular organization of model layers. Thus, the algorithm design of new objects accompanies the development of the object. The concept model, reflecting multilayer structure, is represented by the superposition of two parts: invariant one and the one that develops. Its appliance enables the formalization of the design process to a greater extent.