

INTEGRATION OF MODERN CAD SYSTEMS IN PRODUCTION ENGINEERING SYSTEMS

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Abstract:

The article deals with the problems of integration of modern CAD systems in production engineering systems. The solution offers automated system of choosing the optimal structure strategy, which has the lowest rate of loss of information during its migration between different CAD systems. The problem of the integration of modern CAD systems, which exists due to the presence of large amounts of diverse data formats, such as: STEP, Parasolid, ACIS, IGES, STL, etc. In order to with great confidence to predict the possible loss of information when converting and then. exchange of data between the formats you need the opinion of an expert in this field. This technology makes product design more efficient by automating processes that were once manual, such as traditional drafting. With 3D CAD, designers can also do solid modeling, creating three-dimensional representations of their products.

Keywords: automated system; integrative; CAD system; cross-domain transition; the loss of information.

1. Introduction

Currently, all major machine-building plants in the stages of design and technological preparation of production using CAD systems. This CAD can be of different levels, depending on the stage implemented or complexity of the part. If the production requires sequential use different CAD systems, the problem may be the loss of information at the transition from one stage to the next production cycle. CAD software for mechanical design uses either vector-based graphics to depict the objects of traditional drafting, or may also produce raster graphics showing the overall appearance of designed objects. However, it involves more than just shapes. As in the manual drafting of technical and engineering drawings, the output of CAD must convey information, such as materials, processes, dimensions, and tolerances, according to application-specific conventions. These transitions are called domains. It should be emphasized intradomain and interdomain transition information [1,2,3]. Let us define the concept of "integrative structures-strategies". Integrative structures strategies reflects the property of the system appropriately and with minimal time and money to receive the information from the design stage to the manufacturing stage and vice versa. The introduction of this indicator is due to the fact that at the present stage of development of mechanical engineering on the structure and functionality of the structures, strategies, information technologies affect significantly. In this connection, on the conceptual level, integrative factor takes into account the possibility of the collection, processing and transmission of information generated by one stage of the product life cycle, the subsequent stages with maximum efficiency.

2. Integrative structures-strategies

General information about the transition to the case details can be regarded as the graph transmission of information, presented in Figure 1 [4]. Information on the items from one CAD system to another is carried out in two variants: intra-domain and cross-domain. The scheme of the transfer of information is shown in Figure 2 [4].

The easiest way to transfer information from the point of view of the loss of information is intra transmission. Intra transmission involves the transmission of product information within the boundaries of CAD/CAM/CNC packages per developer. This transfer, in view of homogeneity formats CAD/CAM/CNC package allows it to transmit information without loss when converting from a consideration of the life cycle to another. However, it should be noted that any transmission of information to a higher stage of its life cycle requires additions of new information, the quantity of which is constant for a given phase. Figure 3 shows the intra-information transmission scheme stages CAD/CAM/CNC. In the case of cross-domain information transfer takes place the loss of some of the information at a later stage you want to restore (see. Figure 4) [4].

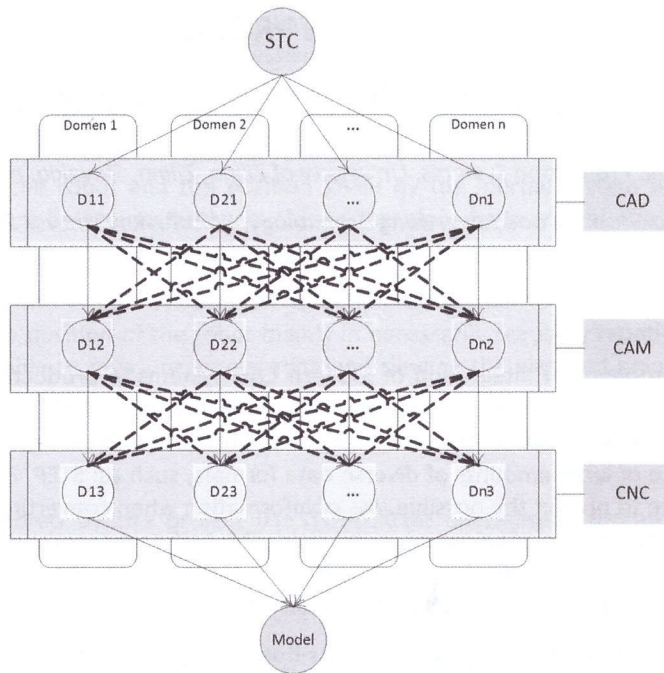


Figure 1. – Schedule of information transfer.

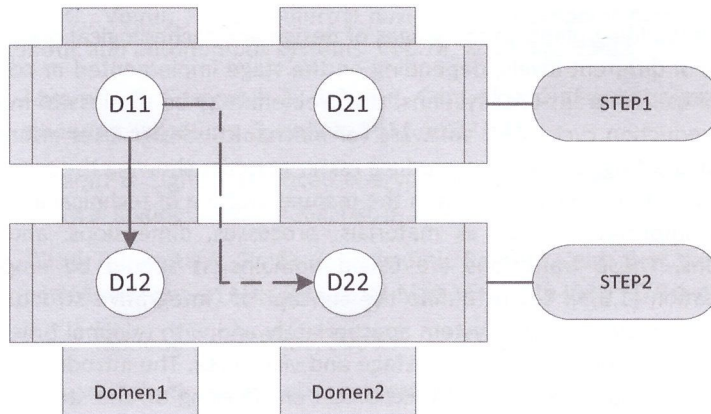


Figure 2. – Scheme of intra and inter-domain transfer.

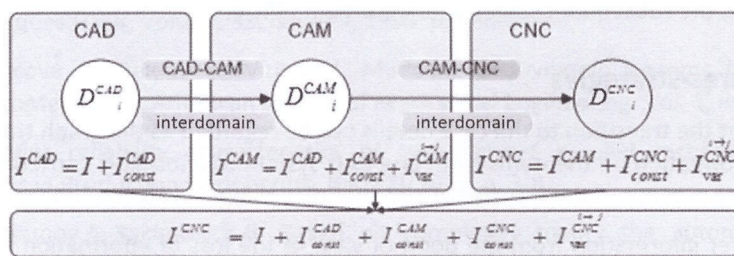


Figure 3. – The transfer of information within a single domain.

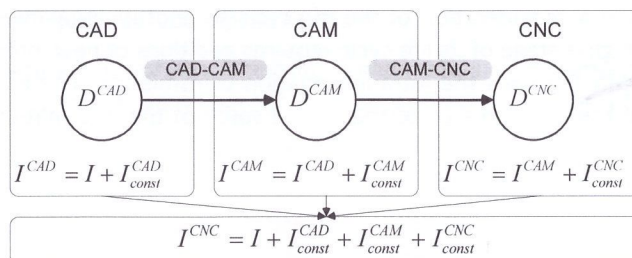


Figure 4. – Inter-domain transfer of information.

To account for lost data on the stages of cross-domain transitions using integrative factor described in the scientific school of Professor B.A. Jakimovitch [1-3, 5-6].

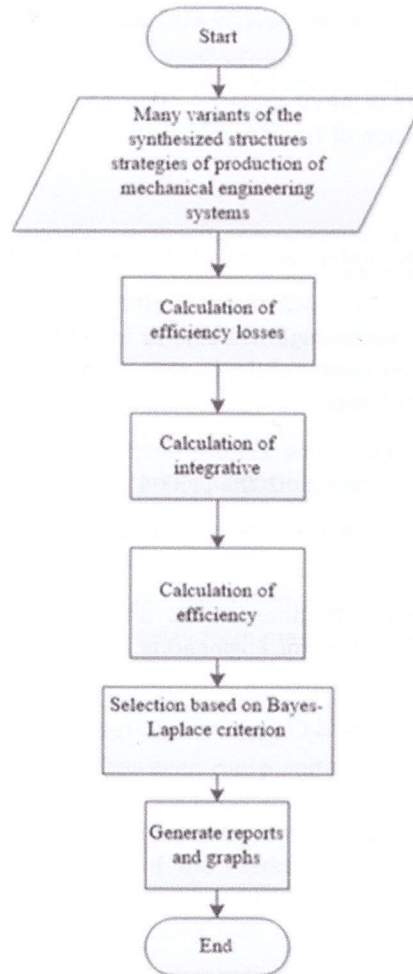


Figure 5. – The general algorithm of the system operation.

Due to the urgency of the problems described, it is required to develop an automated system (AS), which allows to carry out a preliminary assessment of potential losses in the choice of different structures, strategies Substation Engineering. The purpose of this AS is to select the optimal structure of strategies depending on the choice of decision makers (decision maker) of key performance indicators, the most important in this situation.

We describe the architecture of AS.

The first step is to define the overall system operation algorithm (see. Figure 5).

3. Conclusion

The principles are as follows:

The client layer - is a dynamic web page, access to which is available to any registered user on the network.

Logic Layer - contains all the necessary algorithms for the solution of the problem. Handles incoming requests from the client level, it makes the necessary calculations required to sample information from the data layer, and converts into a format that can be displayed at the client level.

Data layer - contains all the necessary information in a structured database.

The article was the problem of the integration of modern CAD systems, which exists due to the presence of large amounts of diverse data formats, such as: STEP, Parasolid, ACIS, IGES, STL, etc. In order to with great confidence to predict the possible loss of information when converting and then. exchange of data between the formats you need the opinion of an expert in this field. To solve this problem, the idea of the implementation of the AS proposed, which takes into account all the possible data loss during transmission of documents in the cross-domain move, using integrative index.

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