Abstract

of attestation master's degree work

subject:

"Research of features construction of scheme editors"

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Actuality of work

Today the presence of graphics scheme editor became a de facto standard for computer-aided design systems. A scheme editor allows in an obvious form to specify a research object. Thus the user is not require to know the syntax of the problem-oriented language.

A research object is represented by a list of components of specific type and connections between them. A research object can be specify by two ways: graphicly (principle electric scheme), or in a text form (description of components and connections between them in problem-oriented language).

Presentation of research object in a text form is in obvious or in a non-obvious form in any CAD system.

Graphic presentation is more evident and intuitional clear. Especially it is correct for a small research objects. Graphic description is not tied to any scheme design package. Therefore the presence of scheme editor in CAD system allows to extend the number of potential users.

In addition, research object's principle electric sheme is one of output documents. Thus scheme editor can be used as a comfortable tool for preparation of project documentation.

As practice shows, the most frequent error on the scheme design stage is disparity of principle electric sceme and research object's description in problem-oriented language. Using scheme editor, user does not have to work with text description. Therefore the possibility of divergence of graphic and text description is practically eliminated. Nevertheless, even if an user made changes to text description, then the verification function of scheme editor allows to inform the user about present disparities. With the purpose of increase of the labour of user productivity a modern graphics scheme editor must give the high-efficiency tools of automation of input of graphic schematic of substitution, and also to contain the tools of automatic control of correctness of the entered information.

Presently a full functional graphics scheme editor absents for the package of the схемотехнического planning of ALLTED. This circumstance does actual the task of development

and research of algorithms and receptions of construction of graphics scheme editor, and also creations of programmatic realization of scheme editor.

The purpose of work

The purpose of the real work is development and research of algorithms and receptions of construction of system-independent graphics scheme editor for the package of the схемотехнического planning, application of which would allow substantially to promote the degree of automation of works, related to the input of initial information about the object of research, and by creation of project document, and also creation of programmatic realization of graphics scheme editor for the package of ALLTED.

Tasks solved in work

For achievement of the put purpose the followings tasks decided in-process:

- research of possibilities of existent scheme editors, exposure of their dignities and failings;
- determination and analysis of requirements, produced to the graphics scheme editor for the package of the схемотехнического planning;
- development of algorithm of automatic leadthrough of routes;
- development of algorithm of automatic adjustment of form of route;
- development of algorithms of providing of correctness of graphic schematic of substitution;
- development of algorithms of editing of graphic schematic of substitution;
- development of structure of database of scheme editor;
- development of algorithms of the automatic forming of lists of sites of connecting of two- and multiterminal components;
- development of algorithms of automatic generation of text schematic of substitution;
- choice of tools for providing of independence of scheme editor from a vehicle-programmatic platform;
- development and research of programmatic realization of graphics scheme editor for the package of the схемотехнического planning of ALLTED, on the basis of the developed algorithms and principles.

The achieved results

Deciding the tasks put in-process, an author protects:

- algorithm of automatic route tracing on the basis of modification of wave algorithm;
- algorithm of automatic route correction;
- algorithms of providing of correctness of graphic schematic of substitution;
- algorithms of the automatic forming of lists of sites of connecting of two- and multiterminal components;
- algorithms of automatic generation of text schematic of substitution;
- optimized structure of database of scheme editor;
- programmatic realization of the developed algorithms and structure of database in composition a graphics scheme editor for the package of the схемотехнического planning of ALLTED.

Scientific novelty

The scientific novelty of work consists in the following:

1) the algorithm of automatic leadthrough of routes, being modification of wave algorithm, is developed, and different from it:

- by the terms of distribution of wave;
- by the method of choice of trajectory of route;
- by the receptions of improvement of form of route.

2) the algorithm of automatic adjustment of form of route, based on application of algorithm of automatic leadthrough of routes, is developed;

3) the algorithms of providing of correctness of graphic schematic are developed substitutions, allowing to prevent the origin of improper situations at forming of draft of chart of substitution;

4) the optimized structure of database of scheme editor is offered, the distinguishing features of which it is been:

- minimum surplus of presentation of information;
- multilevel structure, allowing separately to keep information, related to the graphic model, type of device specification and template of connecting of model;
- presentation of information is in a form, simplifying the construction of algorithms of the automatic forming of lists of sites of connecting of components;
- opened structure, simplifying the process of expansion and modification of database;

5) the algorithms of the automatic forming of lists of sites are developed connecting of дву- and multipolar components, using the offered structure of database of scheme editor;

Practical value

On the basis of the offered receptions and algorithms programmatic realization of graphics scheme editor is developed for the package of схемотехнического проетирования ALLTED.

Conclusions

The review of existent graphics scheme editors is in-process resulted with pointing of the inherent by it failings. The known principles of construction of scheme editors are also resulted. Reasons of the most widespread improper situations which can arise up in existent scheme editors at forming of draft of chart of substitution are analysed. The ground of necessity of development of scheme editor is Given. The basic requirements which a graphics scheme editor must satisfy are formulated.

Basic principles of construction of graphics scheme editor are certain. Its module architecture is offered. The choice of tools is grounded for creation of programmatic realization of scheme editor.

The algorithm of automatic leadthrough of routes, and also algorithms related to it, is developed, such as an algorithm of automatic adjustment of form of route and algorithm of round of count of connection.

The algorithms of providing of correctness of graphic schematic are developed substitutions, allowing to prevent the origin of improper situations at forming of graphic schematic of substitution.

The optimized structure of database of scheme editor is offered. The decisions fixed in its basis allow to decrease surplus of presentation of information and simplify the process of forming of lists of sites of connecting of components.

The algorithms of automatic generation of text schematic of substitution are developed. The questions of recognition of errors are considered in the graphic schematic of substitution and in descriptions of components.

The algorithms of implementation of basic operations of scheme editor are offered.

A short developed programmatic implementation of graphics scheme editor specification over is brought.

Work on 172 sheets contains 56 illustrations and 1 appendix. By preparation of work the literature from 10 different sources was used.

The list of keywords: GRAPHICS SCHEME EDITOR, GRAPHIC SCHEMATIC OF SUBSTITUTION, AUTOMATIC ROUTE TRACING, AUTOMATION OF PREPARATION OF PROJECT DOCUMENTATION, SUBSYSTEM OF GRAPHIC INPUT