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SOFTWARE IMPLEMENTATION SYNTHESIS SCHEMES TERNARY LOGIC USING GENETIC ALGORITHMS

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I. Formulation of the problem

Exhaustive of all possible scheme variations, that will work on quantum phenomena provides an optimal solution, but has exponential complexity and require too much time [1]. Therefore, the development of methods for the synthesis of return schemes that would provide quasi-optimal result at polynomial computational complexity is urgent and important task of the scientific and practical points of view.

II. The purpose of the work

The purpose of research is the software implementation and optimization synthesis method of inverse ternary logic combinational circuits using genetic algorithms (GA).

III. Encoding individuals in algorithm synthesis ternary return combinational schemas

Diagram represent a particular series-parallel arrangement of logic gates managed and unmanaged, but each tier can be no more than one gate type A (0).

Individual represent a structure composed of chromosomes and the value of fitness function of chromosomes [2].

Chromosome represent vector genes that set the stage of the gate in a real circuit, and the gate can have up to 5 inputs and 5 outputs.

Encoding. All valves, regardless of the number of inputs and outputs coded by eleven digits. The first digit indicates the type of gate, other indicate the inputs and outputs sequentially in pairs, no line is encoded by zero. To the left are the input line, to the right their respective output line. Line L(n) - is a constant line, the number in parentheses is the value that should apply to this line for the correct operation of the gate.

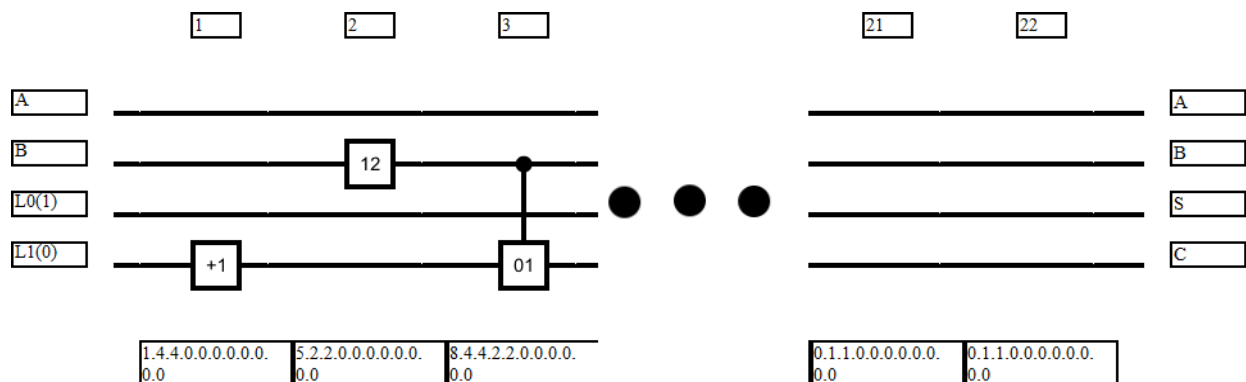On figure 1 an example of coding chromosome.

Figure 1- An example of coding chromosome

This coding can be improved by abolishing the inability to accommodate more than one gate on the circle, so the replacement gene vector for the matrix and the corresponding modification of code.

Conclusion

As a result of research performed software implementations of the method of synthesis of ternary return combinational circuits using genetic algorithms in C ++ Builder environment 10. The results of the research are synthesized adder and full adder MS-based primitives.

Reference

1. Ternary system calculus. [Electronic resource]. - Access: httr: //uk.wikiredia.org/wiki/Triykova_systema_chyslennya.
2. Genetic alhorytm. [Electronic resource]. - Access: httr: //uk.wikiredia.org/wiki/Henetychnyy_alhorytm