N. Ivanov. About the Space Formed by FPGA Devices. В: Т. Атанасова (Редактор), Сборник "Моделиране и управление на информационните процеси", София, България, 2010, КТП, София, 2010, стр. 165-168

ABOUT THE SPACE FORMED BY FPGA DEVICES

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Abstract. *This paper discusses FPGA devices in the light of their three mutual independent properties. Based on them, a theory of non Euclidian space formed by FPGA devices is offered.*

Key words*: FPGA, non Euclidian space*

Introduction

One of the most interesting and promising areas to ensure the development of theory and practice of modern methods and means of communication is the use of different kinds programmable FPGA devices.
They allows you to build a wide range of general and special purpose hardware-oriented platforms, that can be used in various projects and devices for a short time to market, lack of risky investments and lower total cost of a development project.
These platforms have the opportunity to reorganize and development, easy maintenance, which is very handy when it comes to meeting the requirements that apply to most modern design and engineering projects.
In addition, we have assumed that FPGA devices can be represented in the form of abstract mathematical models, which gives the green light to use them in all current and future high-tech systems and devices for managing and processing information.

Representation of FPGA devices

One of the possible forms of abstract representation of FPGA devices, which can be implemented in terms of modern theory of information

transmission is their consideration in terms of computing power, memory and speed of input / output.

As a first approximation, these parameters show signs of mutual independence, and hence they can be regarded as a kind of orts, over which a space is formed. This space describes the properties of FPGA devices, without entering into conflict with one of the most accurate definitions of the concepts of space, combining the best way to key aspects theory and practice, given by A. A. Friedman [1].

Definition*: The space (including geometric) is a collection of things called dots, lines, surfaces, angles, distances, etc., facing each other in certain respects, established a system of axioms and derived from these axioms.*

The description and the study of the properties of space in each point are related to the number of coordinates. This process A. A. Fridman called as "arithmetization space." Based on its properties, any space can be attributed to one of two groups.
The first group includes the so-called Euclidean space. They have zero curvature and their properties do not depend on the chosen coordinate system. In this sense, they are invariant to the transformation of the coordinate system.
Spaces belonging to the second group have a combined name of Riemannian spaces. For them, the properties of the space depend on the chosen coordinate system.

For practical purposes, FPGA devices can be viewed as objects described in the Euclidean space covered over orts formed by computing power, memory and I / O-.
In theoretical aspects, however, the addition of two additional orts (time and number of transistors) gives a different image of the space formed by the devices FPGA. The first feature of the new image of this space is related to a graph showing the growth rate of the density of integrated circuits and the performance of EDA (Figure 1).

Second feature can be understood if we look at Figure 1 from the viewpoint of the deflection of light as it passes near massive bodies. By itself, this means that the FPGA devices have a fairly large "mass" (gravity), capable to bend their space. Thus, logically the question, "what kind of space forms the FPGA devices and what can be obtained by studying it?

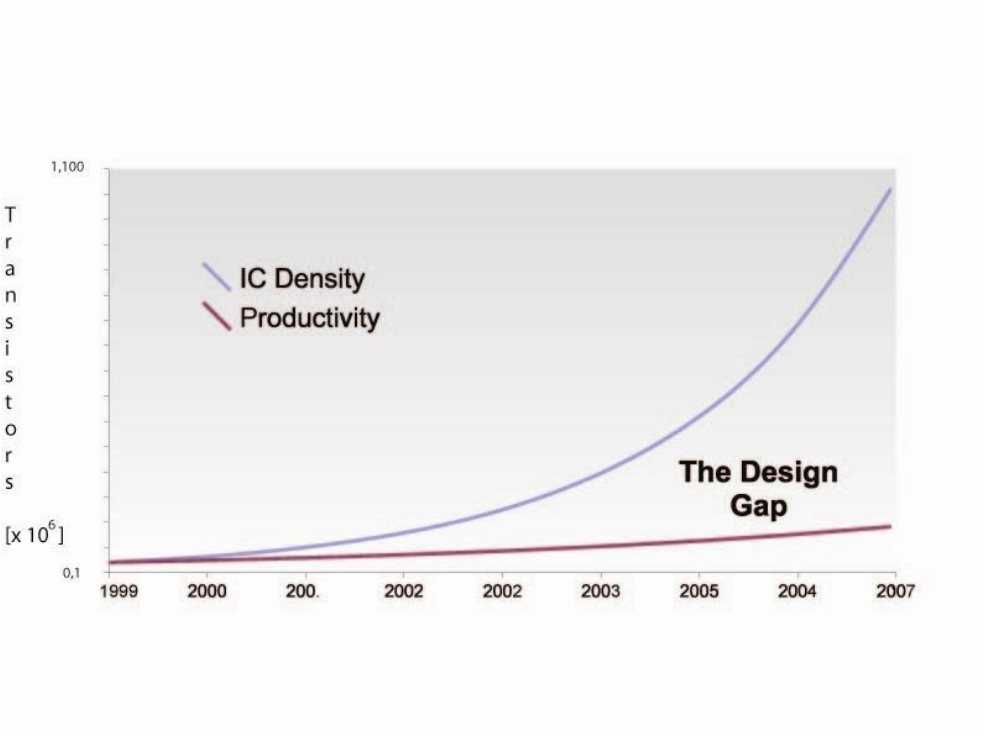

Figure 1.

While it is difficult to put forward a coherent, firmly standing theory that gives one an indication of where should start biting problem. However, there are some ideas on how to make single, random calculations that indicate that the space formed by FPGA devices, has a large curvature (about 100). By itself, this fact can be interpreted as a tightly closed in a space, and if we talk in terms of astrophysics, from there you can expect the birth of "supernova." Want to add in conclusion that the time period for which the estimated curvature of the space formed by the FPGA devices coincides with the time of occurrence of various FPGA devices by type of family Virtex 4.

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Относно пространството формирано от FPGA приборите

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Abstract. *В статията се разглеждат показателите на FPGA приборите в светлината на три взаимно независими свойства. На тази основа е изказано предположение че те формират не Евклидово пространство.*

Key words*: FPGA, non Euclidian space*