Annals of the Academy of Romanian Scientists
Series on Science and Technology of Information
ISSN 2066-8562 Volume **9**, Number **2**/**2016**

STUDY OF THE EMERGENCE OF SOME HIERARCHIES FROM CERTAIN NUMERICAL PHENOMENA AND OF THEIR IMPLICATIONS

Dan Alexandru IORDACHE[1, 2]

Abstract. *The matter of Hierarchies is especially important for the Complex systems, characterized by a huge number of irreducible uniqueness parameters. Given being the evaluation of the main uniqueness parameters of the complex systems requires the use of computers and this process generates various numerical phenomena [1]-[3], it is expected that some of these numerical phenomena could identify also a certain order among the tremendous number of uniqueness parameters. On the other hand, besides the huge number of specific uniqueness parameters, the complex systems are characterized by some specific co-relations, which generate a restricted number of uniqueness parameters blocks, often considerably more efficient for the complex systems description. As study object, this work has chosen the charge coupled devices (CCDs) – typical representatives of the modern information technology, while the numerical phenomenon preferred to be studied was that of convergence, characterized by the attractor strength.*

Keywords: *Charge Coupled Devices, Dark Current, Numerical phenomena, Attractors strength, Numerical Simulations*

1. Introduction

We studied the dark current of 20 randomly distributed pixels for a backside-illuminated CCD housed in a Spectra Video camera (model SV512V1) manufactured by Pixelvision, Inc. in Beaverton, Oregon. The obtained results referring to the averaged (for each temperature, in the above indicated interval: 222…291 K) dark current and to their standard deviations (for each temperature and pixel) are indicated by **Table 1**.

2. Main Types of Uniqueness Parameters

We will examine the basic case of CCDs operated in a multi-pinned phase (MPP) mode, when the device interface is completely inverted with a high hole concentration, and the surface dark current from the Si-SiO_2 interface will be almost completely suppressed [4]-[7].

a) The elementary basic uniqueness parameters of the CCDs dark current are [8]: (i) the diffusion coefficient D_n, (ii) the effective densities N_v, N_c of the quantum states in the valence and conduction bands, and: (iii) the effective masses m_e, m_h of electrons and holes, respectively, (iv) the concentration N_A of the acceptor impurities,

[1]Prof., Physics Department, University "Politehnica" Bucharest, Romania.
[2]Romanian Scientists Academy, Hon. Member of Section of Information Science and Technology.