STUDY OF AN ESSENTIAL FEATURE OF THE COMPLEX SYSTEMS – THE ENTANGLED STATES: FROM THE QUANTUM ENTANGLEMENT TOWARDS THE SEMIQUANTUM AND THE CLASSICAL ENTANGLEMENT

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Abstract. *The detailed study of a huge number of qualitatively different complex systems, points out that they are really complex (not only some complicate ones), only if their entanglement features are prevalent in their work. For this reason, this work achieves a rather extensive study of the main types of entanglements met today in the theoretical and technical sciences, trying to find also a quantitative characterization of the: a) entanglement degree, b) dis-entanglement processes, that lead usually to the destruction of the considered complex systems.*

Keywords: Complex systems, Semiquantum and classical entanglement, dis-entanglement

1. Introduction

As it is known, both the Theoretical Sciences and the Technical ones, especially, are complex sciences, with tremendous numbers of characteristic elements. We have to underline also that these characteristic elements are not related by some obvious deterministic relations, their connections being in fact rather hidden at first look and even after several other examinations.

We consider as a good example - the evolution of one of the most important inventors of the previous (20^{th}) century in the field of Technical Mechanics: Robert Gilmour, perhaps the most prominent specialist in the frame of the land leveling works initiation.

As it results from his book [1], Robert Gilmour began his activities in the fields of the foundry, of the solder, of the electrical accumulators, of the electrical generators and engines, and begun only finally his works in the domain of the mechanical machines. His outstanding results in the field of mechanical machinery (tractors, scrapers, bulldozers, etc.) became possible only due to his remarkable experience and expertise in the totally different technical fields, as those of metallurgy, electrical engineering and many others.

We will start from the simplest types of entanglement (those met in the Quantum Physics) and continue with some examples from the semi-quantum, and finally from the classical sciences.

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