PhD Thesis Abstract

CONTRIBUTIONS ON THE OPTIMIZATION OF INTEGRATED TECHNICAL SYSTEMS OF INFRASTRUCTURE FOR CIVIL AND MILITARY OBJECTIVES

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Motto

The change is the price paid for progress as the price paid to wisdom is doubt.
Human dignity has received through science one of its first testimonies.
Prosperity societies have emerged from the application of new technology and have disappeared because they have departed from it.

The results of the research shown in the present paper answer the current requirements regarding technological development and its applications in technological and informational integrated communities. R. Decartes opens the rational era "Dubito ergo cogito, cogito ergo sum", which contains in itself the optimism of creation and knowledge: the world has thus been created in order to be known by means of an instrument which appeared in the last part of the adventure of the Universe, namely the human brain.

From this point on science and civilization have known several technological revolutions: the era of the mechanical machines, the energy automated machines, the computer applications and technical cybernetics, and after 1997 (the year when Deep Blue wins the competition with man) the digital era (industry 4.0) of teleological machines which prefigures the fusion between man and robots in integrated hybrid entities.

Through science technology becomes cumulative and the processes regarding adapting and integration in mechatronic structures becomes irreversible.

The approach, from the perspective of the general system theory centers the research not on the study of the components of an integrated system but on the interplay between them (which describe the behavior of systems and interaction to the exterior environment, expression of the self-adaptive and self-educative processes.

The deep involvement of technical sciences in the humanist domain and society has lead to the replacement of the traditional philosophy values (good, beauty and truth) with new values: efficiency, resources, goals, quantitative indicators, optimum, values which reflect the use of shaping and simulation in all areas of technical and social research.

The mathematical methods used in steady state systems study are optimal methods with restrictions that, in the case of reactive systems (sub-domain of energy production in Smart City), use the law of thermodynamic entropy that allowed me to apply the thermodynamic principles in modeling local communities as technical integrated systems with memory and adaptability capacity, adjustable, lead, command and control.

The stand which was built during the document preparation simulates thermal, mechanical and informational activities, fluid movements, transmission and execution of commands, transmission of reports, as well as monitoring the functioning of integrated technical systems (ITS).

The case study responds to the current technological challenges (ubiquitous technology, Cloud computing, artificial intelligence combined with human intelligence, augmented reality, human brain retro-engineering, nanotechnology, intelligent integrated technical systems) by creating a unitary technological concept of a community called Smart City.

Conclusions and contributions respond to the current offensive of the technique that conquers human sciences, work, fun, governance and justice, creating a new field of interaction between the brain and the technique called BCI (Brain Computer Interaction).