**What are Cybernetics and Systems Science?**

(1)Cybernetics and Systems Science constitute an academic domain, that touches virtually all traditional disciplines, from mathematics, technology and biology to philosophy and the social sciences.

Systems theory or systems science argues that however complex or diverse the world that we experience, we will always find different types of organization in it, and such organization **(2)** can be described by concepts and principles which are independent from the specific domain at which we are looking. The systems approach distinguishes itself from the more (3) traditional analytic approach by emphasizing the interactions and connectedness of the different components of a system.

So general systems theory is about developing broadly applicable concepts and principles, as opposed to concepts and principles specific to one domain of knowledge.

It distinguishes dynamic systems from static systems. An example of dynamic systems is complex adaptive systems. CAS are special cases of complex systems: they are complex in that they are diverse and composed of multiple, interconnected elements; they are adaptive in that they have the capacity to change and learn from experience. Passive systems are structures and components that are being processed. For example, a program is passive when it is a disc file and active when it runs in memory. The field is related to systems thinking, machine logic, and systems engineering.

Although the systems approach in principle considers all types of systems, it in practices focuses on the more complex, adaptive, self-regulating systems which we might call “cybernetic”. Cybernetics was first introduced by the mathematician Wiener, as the science of communication and control in the animal and the machine (to which we now might add: in society and in individual human beings).

In fact, cybernetics and systems theory study essentially the same problem, that of organization independent of the substrate in which it is embodied. But system theory has focused more on the structure of systems and their models, whereas cybernetics has focused more on how systems function, that is to say how they control their actions, how they communicate with other systems or with their own components. Since structure and function of a system cannot be understood in separation, it is clear that cybernetics and systems theory should be viewed as two facets of a single approach. So the commonalities are much larger than the differences, and therefore it is worth attempting to integrate the different approaches in a common conceptual framework.