

## Considerations regarding the concept of the level of reality in the process of learning the transdisciplinary approach

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**Abstract.** According to the transdisciplinary approach [15], the leap from one level of reality to another requires the generation of a third party [9], on a certain level of reality, which leads to the reaching of a superior level, through knowledge and complexity. In technical terms, what exactly is the third party included? How does it manifest? The way through which, on a reality level of the technical system one can acquire extra knowledge is called integration [10], [12].

### 1. The integration and reality

The integration is visible in reality through two abilities: integration through the generation of extra knowledge in the system and integration beside this extra knowledge and of one third party included on that level. The third party included, in a philosophical sense, means the existence of an A and a Non A, on the same level [9]. In technical terms, this third party cannot be represented but by one component, an equipment or integrated subsystem.

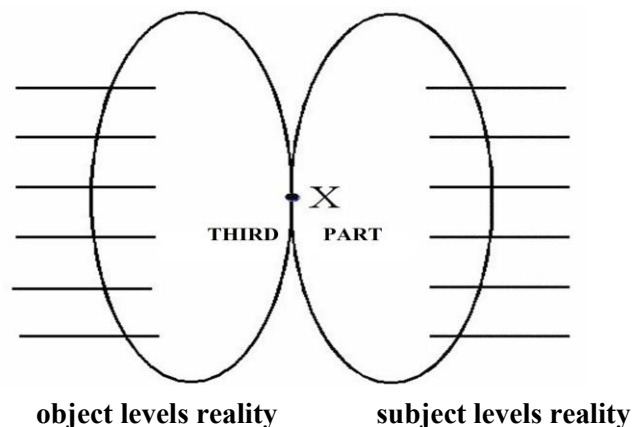
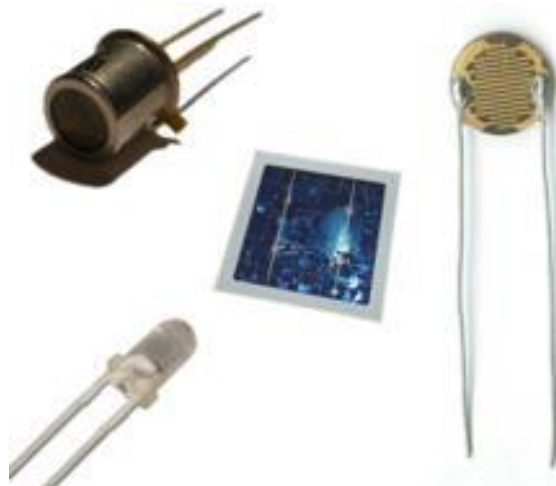


Figure 1. Level reality.

We have already know above what the third party has meant in a hystorical meaning, on each and every level. We have specified on the superior level the third party, from the inferior level, which has lead to the occuring of another type of reality. A level in itself is not superior because it is above others, or because it has more components or subsystems which are integrated, but because it generated, on the basis of the included third party, a bit of extra knowledge that corresponds to a new reality, that is that of the coexistence between A and Non A, in the sense of matter=substance +energy+ information +entropy [1], [2], [5], [6]. The integration can generate extra knowledge without the support of a third party. But this third party does not divide on each level, but it changes on an informational manner [22], [23], [24]. To demonstrate this, we should analyse now the mecatronic system, fom a superior level, down to the basis. Supposing that from the interface (situated on the information level, which according to my opinion is not the last level,as I am about to show), we edit a command in the system. On the level of the interface this is, from a physical point of view, a digital sign (joint if we use the bivalent logic of the usual systems of calculations or with more means if we use a system with Fuzzy logic or a quantifying calculator). (Here is the level of the artificial intelligence that exceeds the informational level. That is to say, another level). On the sensitive level, the sensor-the third party included-gets the signal with the logical possibility of true or false and, according to the stimulus it allows me or not the passing of the command, that is of the signal with which it operates.

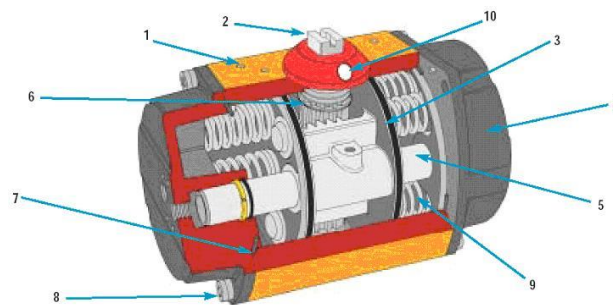


**Figure 3.** Sensors and transistors.

## 2. The integration and reality

This signal is recognized by the electronic level , which on its way through the transistor- the third included party- becomes electrical impulse of power, lack of power. The rotating actuator - a third party on the electro mechanical level, gets the electrical sign and changes it ina a movement moment, which generates movement for the executional element on the physical level. Now if we look from downside to upside we notice that the signal which starts from a level aquires, through the third pary , a plus of quality, more quantity and extra energetic, informational power, specific to the realities of every level. This signal aquires an extra knowledge that is superior to the inferior reality. From an informational point of view, the digital signal is a superior reality, compared with the electrical or the electronical systems. That is, we could always change any kind of text into a digital one and then in power impulses, or no powered impulses, but you can't change, on the other hand, any kind of power into a digital one and then into a text. So, the integration that brings up in the mecatronic science, a third party, besides extra knowledge, generates, in a technical sense, another level of reality.

On the basis of what is mentioned above, we can sustain the fact that, starting from a rudimentary system, on a physical level, we can manage, through integration and a third party, to obtain a system which is technically changing and which can suffer transformations of a reality that rules a system, in a superior reality that governs another level: physical in electromechanical, electromechanical in electronic, electronic in sensitive, sensitive in informational, in the artificial intelligence and so on. The third party may be built up from subsystems, as well. The rotating actuator is an example of fixed integrated elements, which, through coercion, generates movement in the system, with the help of an exterior signal [7], [13].



**Figure 2.** Rotating actuator. Note 1 to 10 - integrated components through constraint.

If this signal comes from a superior level of reality, compared to a mecatronic system, as i have shown above, then the actuator is the third party here. But if you look at it in isolation, it isn't. But, can we consider nowadays the actuator, a separate part of the system? Of course we can't. All the actuators bearing mechanical characteristics function on the basis of the laws that rule the electromechanical level [8]. Even those that are part of the real, those that we haven't invented yet. According to the transdisciplinary approach, the hidden third party, permits that the reality levels won't self destruct, but to transmit through the generation of the third party, from each level, something superior to the next superior level. Thus, in technical terms, this means balance in the mecatronic system [19]. But who refines this balance? The answer is, with no doubt, the human being, who, through, integration, as we have mentioned above, ensures the reality levels in mecatronic [20], [21], [24]. Man is always present, both integrated in the system and outside it. This is a concept taken from quantum mechanics of the particles that, for a short time we can notice, but which transcend another reality [16], [17], [18]. After a man set a system into function, he is already integrated with it, even if he went out for a beer in the meantime. How can this be possible? The engineer has obtained, on the basis of the information from his superior level of reality, a reality for each level of the mecatronic system. From an informational point of view, he established a balance between the levels of the system. Its balance is governed by the informational area, created by him for the system, that is, he created a hidden third party for the system. The side that embodies human knowledge, that the system needs, is thus, incorporated. This is just like an informational fingerprint on the part of the man, for the system. If I am allowed to make a comparison, it's like the omnipresence of god related to our world. As much as we should or must know. This doesn't mean that we will send God to have a beer. Can a mecatronic system function without a superior level? Of course it can.

The actuator generates movement even without an interface, sensors or transistors. It only needs external energy, that should be from the same level. Can a superior level exist without an inferior level? No.

### 3. Conclusion

We don't have an interface without information, we don't have information without sensors, we don't have sensors without transistors, we don't have transistors if we don't have an actuator, that is to whom we can order signal and actuator without fixed components. This finally means superiority on the part of upside, compared to the downside, which means an informational autonomy on the part of the superior towards the inferior.

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