

## Field Effects in Mathematical Modeling's

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### ABSTRACT

It is about to beware of a misinterpretation of the role of each parameter in mathematical equations. Indeed, a field model effect can lead to a wrong understanding.

**Keywords:** Aging, Concept, Modeling

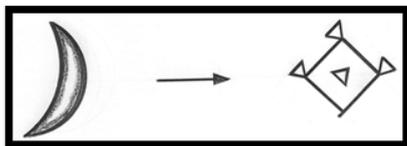
**Key Ideas:** Invention of time, Time is a concept, Time does not cause aging, Modeling is not always possible, Time is not measurable, A distance travelled does not depend on time, Formal defects of definitions of CGPM

### INTRODUCTION

In the course of their progression, the sciences have left, and they still leave, islands of ignorance, and the most paradoxical of which is the notion of «time». From the start of this investigation over twenty years ago, it appeared that «time» was not defined, that its nature was not identified, and that its properties were not described [1]. Given that time is systematically used as soon as there's a change, such as a movement, it's quite paradoxical. In that purpose, we have had to investigate otherwise by implementing long research with the help of interdisciplinary to succeed in solving these enigmas; but the ignorance about the nature of time still leads to side effects regarding its alleged action in mathematical models of physics caused by what I call «field model effects».

### THE INVENTION OF TIME

Temporality was invented by Sumerians about 2800-2500 BCE (Before Common Era) [2], they observed a repetition of the movements of the Moon; they named «month» what separates two identical positions of the Moon (**Figure 1**).



**Figure 1.** Cuneiform sign for «month», inscribed on clay tablet dated 2800-2500 BCE.

### This discovery is very important for two reasons:

First, it proves that time is a concept instead of a phenomenon.

Secondly, it shows how to define time: time is what separates two states of any system.

It was necessary to have a general concept to which we could refer instead of referring to the Moon movements.

### MATHEMATICAL MODELING OF A PHENOMENON

The word «model» designates the mathematical relations between all the data regarding the system, including relations with its surrounding. The General Relativity developed by Einstein in 1916, is composed by a group of ten equations with ten unknowns. But, so far and due to the complexity, no general solution could be calculated. Fortunately, the Universe has many particular cases which allow us to simplify the equations and find solutions. Sometimes, mathematical modeling is impossible. In an article about vintage wines [3], we have put in light that aging of the wine is not caused by time; it results from many factors, including complex chemical and biological reactions [4], impossible to modeled. Another interesting example provided with wrinkles: they are not caused by time; indeed, they result from too much sun and lack of skin care. In certain countries we find young people with wrinkles.

Wine and wrinkles lead us to conclude that modeling is not always possible and that it's necessary to beware of our

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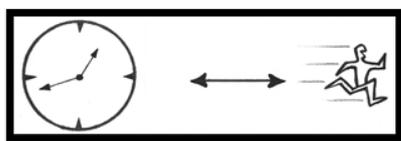
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observations. At large, time is not the cause of any aging. When a modularization of a phenomenon is possible, we must beware of common traps I call «Field Model Effects».

### FIELD MODEL EFFECT

What does mean «field model effect»? The word «field» designates what we are observing, the subject of the study; the word «effect» designates what we perceive and what we feel about the subject. Two examples provide a simple illustration of a field model effect. The runner and the stopwatch: the timekeeper starts the stopwatch at the start of the runner, and he stops it at the finish (**Figure 2**). It's very important to understand that the timekeeper does not measure the duration of the race, as is generally believed; it would be a field model effect.



**Figure 2.** Time is what the runner and the clock do.

It leads to another conclusion: time and duration are not measurable, for the reason that they have no physical properties; they are concepts. A train moving at speed «v» travels a distance «d» during time «t». The mathematical model is simple:

$$\text{distance «d»} = (\text{speed «v»}) \times (\text{time «t»})$$

Then the mathematical model can read:

$$d = v \cdot t$$

What is the cause of the distance «d» travelled?

Is it «t»? or «v»? or both of them? A simple analyze can help us to decide:

As «t» is time given by the clock of the railway station, it has no action on the train. This is why when the train stops at the station, the clock does not stop: «t» is never zero; time is not involved in the move of the train. Therefore, the distance travelled is depending on the speed «v»; when the train is stationary, «v» is zero. In other words, «v» is the capability of the train to move. As long as «v» is zero, the train won't move, although the clock keeps going. A field model effect makes some people think that the distance travelled is depending on time; it's a typical misinterpretation of the role of time in the mathematical model.

### FORMAL DEFECTS

Nowadays we could not keep referring to the moon or the Sun, that is to say realities, for evaluating phenomena. We use concepts like «year», «month», «day», «second» which is the international unit of time. Given that scientific definitions have force of law worldwide, their wording

should be free of formal defects. According to the CGPM 2019 [5]: «... the second is equal to the duration of 9 192 631 770 periods ... etc». Well, we have two formal defects: First, as long as the duration is not defined, it must not be used in such an important definition. Secondly, the period is the duration of a cycle; then the «duration of a period» is the duration of the duration of a cycle: it is a sophism which is explained by a wrong analysis of the role of time in the models, caused by a field model effect.

### CONCLUSION

The Sumerians invented the first writing less than 5000 years ago. We found out from an archaeological corpus; a cuneiform sign inscribed on a clay tablet meaning «month»: this is the first trace of time. The invention of time by Sumerians would step by step lead to an upheaval of the knowledge of dynamic phenomena, thanks to mathematical models of physics. It must be emphasized that the concept of time is not the cause of any phenomenon: it's a theoretical reference parameter. Of course, the Sumerians could not imagine the importance of their discovery.

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