BULETINUL INSTITUTULUI POLITEHNIC DIN IAŞI
Publicat de
Universitatea Tehnică „Gheorghe Asachi” din Iaşi
Tomul LVII (LXI), Fasc. 4, 2011
Secţia
ELECTROTEHNICĂ. ENERGETICĂ. ELECTRONICĂ

MAGNETIC TESTING STAND DESIGN USING THE FIBONACCI SEQUENCE AND THE GOLDEN RATIO

BY

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Received, May 31, 2011
Accepted for publication: July 16, 2011

Abstract. A method of association the Fibonacci sequence and the golden ratio with designing a magnetic testing stand is proposed. The idea behind the stand was already described (Searl, 2006) and purportedly developed (Roscin & Godin, 2001). However the technology of the experiment goes further and proposes a new dimensioning paradigm for obtaining the peculiar effects, which are related also to performed experiments (Podkletnov & Nieminen, 1992; Podkletnov & Modanese, 2011; Tajmar *et al.*, 2011) and theoretical findings (Tajmar & de Matos, 2011; Pitkänon, 2001;Li & Torr, 1991; Ridgely, 2011). The Fibonacci sequence and the golden ratio have already been used or described in other applications encompassing different areas of activity (www.edu.larc.nasa.gov/connect; Li *et al.*, 2007; Dunlap, 1997).

Key words: Fibonacci sequence; golden ratio; metamaterials; variable magnetic fields; cryogenics; local gravitational effects.

1. Introduction

According to the results obtained by Searl, (2006), particular outcomes (mass variation, low temperatures) are obtained if three layers of appropriately

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magnetized cylinders rotate with different angular velocities around three fixed rings, duly magnetized as well. If the results obtained by Roscin & Godin, (2001) are accurate, it is then worth further exploring the avenues opened by this line of research.

The magnetic testing stand described in this paper aims at confirming whether the results can be achieved using as a starting point the technical developments already referred to.

According to the results obtained by Podkletnov & Nieminen, (1992); Podkletnov & Modanese, (2011); Tajmar *et al.*, (2011), anomalous physical effects have already been obtained leading to the idea that local gravitational phenomena are attainable with the present day technology. Theoretical explanations have been proposed (Tajmar & de Matos, 2011; Pitkänon, 2001;Li & Torr, 1991; Ridgely, 2011), and far reaching applications suggested stemming from comprehensive scientific theories (Dröscher & Hauser, 2004; 2010). Low temperatures are also supposedly present in addition to local gravitational effects when spinning the cylinders around the fixed rings (both cylinders and rings are made in layers of different materials, including iron, neodymium, Teflon and aluminium).

A concept derived from metamaterials physics (Mackay, 2005; Mackay & Lakhtakia, 2005), can be applied, where metamaterials exhibit unusual properties, like negative permeability, which, energy wise, under specific conditions, may lead to peculiar outcomes, such as decrease in entropy and local gravitational effects. Thus, it is supposed that when rotated with adequate angular velocities, the compound (composite) that makes up the cylinders and rings exhibits different physical properties than the ones of its constituent materials thus leading to obtaining the special physical effects.

2. Fibonacci Sequence and the Golden Ratio

The Fibonacci sequence is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610,… The explicit expression for the Fibonacci sequence involves the golden ratio

$$F(n)=\frac{\varphi^n-(1-\varphi)^n}{\sqrt{5}}=\frac{\varphi^n-(-\varphi)^{-n}}{\sqrt{5}},$$

where two quantities (positive numbers), a and b, are said to be related by the golden ratio if

$$\frac{a+b}{a}=\frac{a}{b}=\varphi.$$

The resulting equation, $\varphi^2-\varphi-1=0$, has as only positive solution

$$\varphi=\frac{1+\sqrt{5}}{2}\approx 1.6180339887...,$$

which gives the numerical value of the golden ratio.

3. Description of the Magnetic Testing Stand

It is supposed that the interaction between unique patterns of rotating and fixed magnetic fields, in a suitable material environment, can lead to mass and temperature variations.

A solution for building a device to prove the hypothesis is to associate the Fibonacci sequence and the golden ratio when designing the components that engender and accommodate the interacting magnetic fields. The device, in the form of a magnetic testing stand, should have a *static structure* (dedicated to sustaining magnetic rings), a *rotating* (*mobile*) *structure* (dedicated to sustaining rotating magnetic cylinders) as well as the parts that contribute to accommodating *the static* and *mobile structure* (*the base structure*) and rotate the moving parts (*the driving* and *control part*) (Fig. 1).

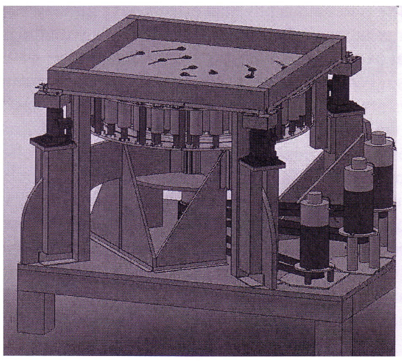

Fig. 1 – The magnetic testing stand.

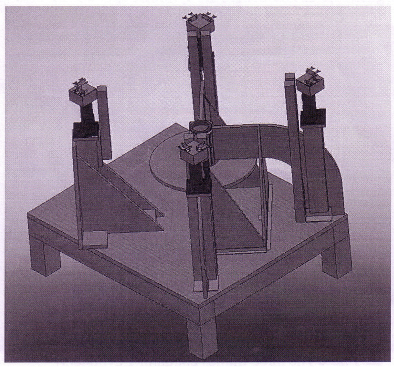

Fig. 2 – The base structure.

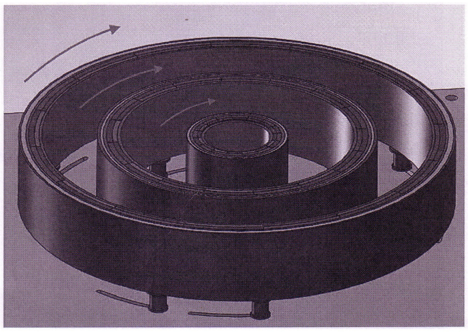

Fig. 3 – The rings attached to the plate.

The *base structure* (Fig. 2), that supports the *static* and *mobile structures*, should include non magnetic materials (Perspex, High Polyethylene HDPE, Medium Density Fibreboard MDF), to avoid magnetic interferences.

The static structure, comprising three concentric magnetic rings (Fig. 3) attached to a plate that needs to provide visibility as well as enough strength to keep the rings into position, engenders the fixed-in-space magnetic field.

The rotating structure (Fig. 4), comprising three concentric frames that rotate in the same plane around the rings and support purpose made magnetic cylinders, engenders the rotating magnetic field. Driven by the frames, the cylinders spin around the rings and, due to the fix and rotating magnetic fields interaction, the cylinders spin around their axes.

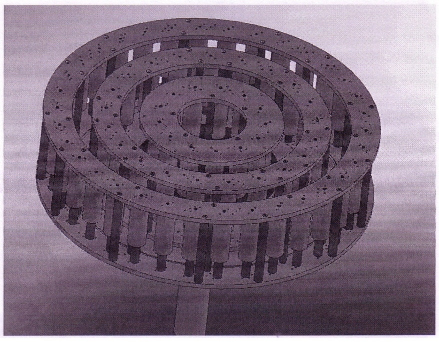

Fig. 4 – The three frames containing cylinders.

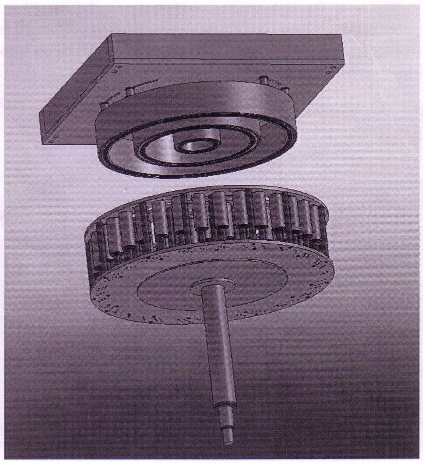

Fig. 5 – The static and rotating structures exploded view.

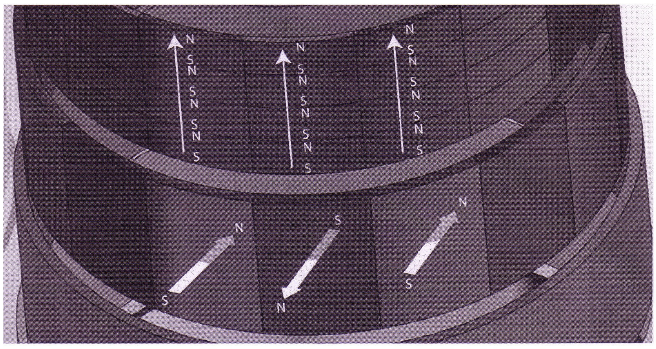

Fig. 6 – Alternating N-S poles radial magnets.

It is proposed that both cylinders and rings include radial layers of iron, neodymium, Teflon and aluminium that exhibit a compound field resulting from two superposed, neodymium produced, magnetic fields: a longitudinal N-S one, and a radial (sequence of N-S poles around the circumference) one. Two possible ways of arranging the radial magnets are shown

a) alternating N-S radial positioned poles (around the N-S oriented longitudinal magnets – Fig. 6);

b) successive N facing interior positioned poles, with the S poles facing outwards (also around the N-S oriented longitudinal magnets – Fig. 7).

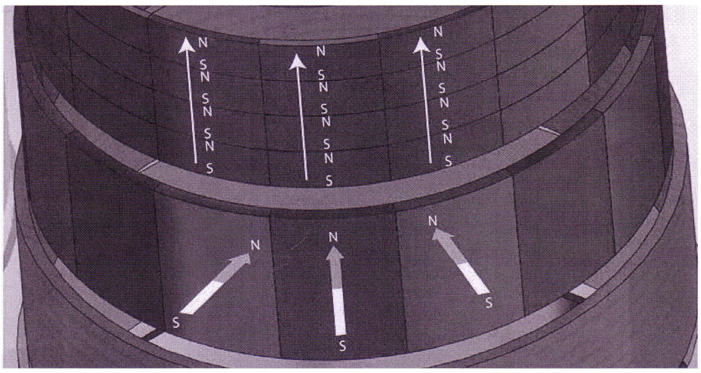

Fig. 7 – N pole interior oriented radial magnets.

The driving and control part, consisting of three electrical motors (Fig. 8), operates the three mobile, concentric containing, frames, that spin the cylinders around the rings.

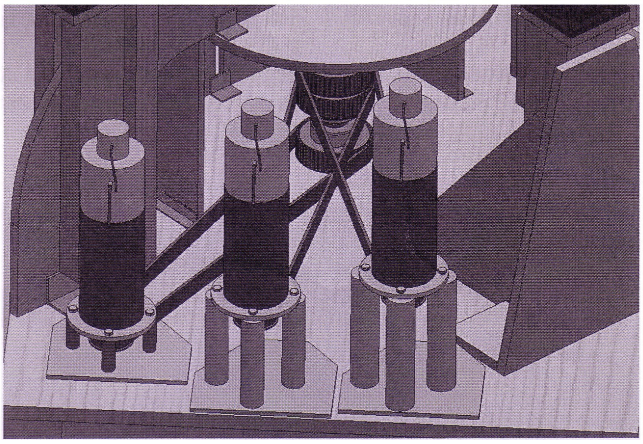

Fig. 8 – The motors and the associated driving belts.

4. Dimensioning the Magnetic Testing Stand

The following numbers are selected from the Fibonacci sequence: 8, 13, 21, 34 and associated with the radial dimensions of the cylinders as in Fig. 9.

The diameter thus obtained (d = 68 mm) is multiplied by the golden ratio to determine the height of the cylinders, which results h = 110 mm.

The height of the rings is chosen to be the same as the height of the cylinders (h = 110 mm).

An interior diameter of $d_1 = h = 110$ mm is proposed for ring *1*, whereas its four component materials layers associate their thickness with the Fibonacci numbers sequence selected for the cylinders (8, 13, 21, 34), determining ring 1 exterior diameter, D_1= 178 mm.

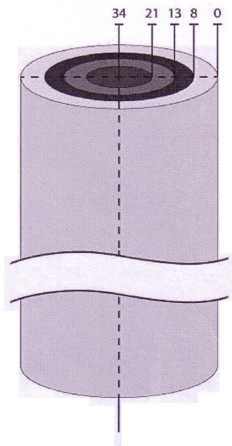

Fig. 9 – Cylinders radial dimensions.

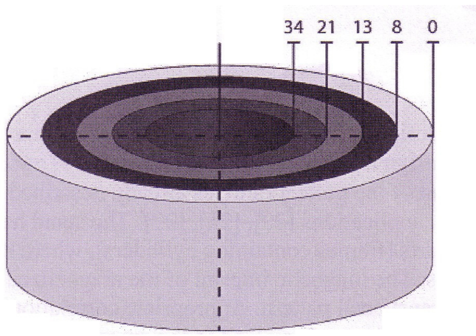

Fig. 10 – Rings radial dimensions.

For dimensioning purposes, the same width is allocated for all three rings that make up the fixed structure (34 mm).

For symmetry purposes, the distance between ring 1, exterior, and ring 2, interior, is equal with ring 1 radius that is 89 mm. The same distance is maintained between ring 2, exterior and ring 3, interior (Fig. 10).

Performing the necessary computations, the data from Table 1 are obtained that describe the dimensions of the magnetic stand *static structure*.

Table 1
Static Structure Dimensions

Ring 1		Ring 2		Ring 3	
d_1, [mm]	D_1, [mm]	d_2, [mm]	D_2, [mm]	d_3, [mm]	D_3, [mm]
110	178	356	424	602	670

The numbers of cylinders that are to be associated with each rotating frame observes the Fibonacci sequence as well (two sequences are proposed, 13-21-34 cylinders and 8-13-21 cylinders).

It is obvious that other design solutions (like increasing the rings' width and distance proportional with the golden ratio) can be associated with the testing stand dimensioning process.

5. Experimental

Each sequence of cylinders, inserted in a corresponding frame, is driven by an associated electrical motor. The frame has to be specifically designed as to enable the cylinders to spin around their axes while performing the rotation around the fixed ring. The material the frame is to be made of (for example, Perspex, or Polycarbonate, according to the velocity to be imprinted) must not interfere with, or influence, the physical phenomena that occur during the experiment.

Various patterns of angular velocities and directions are to be tested to ascertain the appropriate combination that might produce the peculiar effects.

A conjecture, that the experiment may confirm, offers an association between the three revolution velocities, n_1 , n_2 , n_3 , of the three frames at which desired effects are obtained, and the golden ratio, namely

$$\frac{n_1+n_2}{n_1}=\frac{n_1}{n_2}=\frac{n_2+n_3}{n_2}=\frac{n_2}{n_3}=\frac{n_3+n_1}{n_3}=\frac{n_3}{n_1}=\varphi.$$

6. Conclusions

A magnetic testing stand design for achieving local entropy decrease and gravitational effects is proposed. The design is based on an idea shown by Searl (2006), on the utilization of the Fibonacci sequence and of the golden ratio, as already described in the literature pertaining to other various applications (NASA Connect Series, 1999-2000; Li *et al.*, 2007; Dunlap, 1997). The stand has magnetized static parts (rings) and mobile parts (frames containing cylinders), where the mobile parts are driven by electrical motors. The magnetic imprint of the magnetized bodies has a longitudinal as well as a transversal pattern. Appropriate correlation between the angular velocities of the three rotating frames may lead to the emergence of the sought after phenomena. A conjecture is proposed that links the revolution velocities when the desired effects are obtained with the golden ratio.

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UTILIZAREA NUMĂRULUI DE AUR ŞI A SERIEI FIBONACCI PENTRU DIMENSIONAREA UNUI STAND DE TESTĂRI MAGNETICE

(Rezumat)

Se propune folosirea numărului de aur 1.618 şi a seriei lui Fibonacci pentru dimensionarea unui stand de cercetări a cărui construcţie se bazează pe folosirea de

structuri composite. Astfel, sunt îmbinate straturi de materiale diferite din punct de vedere al proprietăților fizico-chimice (magneți de câmp radial şi transversal, aluminiu, teflon şi fier) pentru obținerea de părți mobile şi fixe. Se formulează ipoteza că se pot obține temperaturi cryogenice şi efecte gravitaționale locale prin rotirea cu viteze adecvate a trei structuri mobile ce conțin cilindri magnetizați în jurul a trei structuri fixe, unde structurile mobile şi fixe au aceleaşi materiale componente.