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Dr. Jonathan Tennenbaum

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Subj.: Remarks on 'Amplitude Quantization'
here: Example: Gravity pendulum
Ref.: Your paper on the Doubochinski pendulum
21st Century 18 (2006) 4, 50-63 [1]
Our discussion at TU Berlin on 13.02.2012

Dear Dr. Tennenbaum,

when we first met, at the reception following the final lecture of Bernd Mahr at TUB [2], you told me among others about interesting oscillating systems and phenomena. In the meantime I came across your above mentioned paper, which triggered the following considerations and remarks, maybe of general interest and thus also to be found on my website.

In order to keep the exposition as simple as possible I restrict myself to the discussion of a gravity pendulum of length r with a small body of mass m and of linear mass specific damping β . For ready reference I attach a MathCAD document showing the frequency dependent essential features of the half cycles of a pendulum of length 1 m, mass 1 kg and mass specific damping 0.01 m/s. In view of the Doubochinski pendulum I assume the half cycles to begin and end as the body passes the lowest point.

The important result is the energy lost during the half cycles. In order to keep the half cycles repeating the energy lost has to be replaced during any half cycle. Ideally a mechanism can be 'invented' instantaneously feeding energy 'quanta' into the pendulum at the lowest point. If the energy quanta are, at least on the average, equal to the energy lost, the half cycles will indeed repeat. Pendulum clocks are constructed accordingly, as in fact all clocks.

If the energy quanta added are not equal to the energy lost, the pendulum will not repeat the half cycle, but it will change frequency and amplitude of the half cycles until an energy equilibrium has been established. In general any feed back 'mechanism', natural or 'invented', will exhibit a number of such, discrete equilibrium frequencies and amplitudes.

This 'phenomenon' (!) of 'stone age' mechanics is thus 'the rule' and not the exception, *not* (!) a 'new principle' of '21st Century' mechanics. Admittedly it is an 'interesting' example to be included in future textbooks. In astronomy discrete stable orbits are known. I remember a discussion to that effect in connection with Saturn's rings in a popular exposition.

The Titius-Bode series comes to mind here. It may be of historical interest now, still it has lead to the discovery of the Planetoids, alias Asteroids, similar to the discovery of chemical elements based on the periodic system of Mendeleyev. Another example is the discovery of

various classes of matter with constitutive stress laws 'predicted' by Noll's rational theory of 'simple' continua.

Your remarks and notes on classical mechanics, external forces and the implications of the phenomena discussed in your paper are, at least in my view, much too simple minded, to say it politely, the terminology reminds me of beginners and inventors jargons.

As a reference I just mention the famous book 'Schwingungen' by Kurt Magnus, lucidly covering the state of the art [3]. Since the first edition of 1961 the subjects of the book have been nonlinear systems and their behaviours. This very clear exposition should be compulsory reading for anybody, before writing himself about oscillators. Personally I am still hanging on to my copy of the third edition of 1976, but I strongly feel that I can no longer afford *not* to own the current edition.

That most of the problems of interest cannot be solved explicitly is a truism, not to say a platitude, and this was the reason for the development of many numerical methods, mostly by famous astronomers. In case of systems with (natural) frequencies differing by orders of magnitude, so called stiff systems, e. g., ships in seaways, advanced algorithms are necessary and available, among them Gear algorithms.

Newtonian mechanics even 'permits' chaotic motions of nonlinear systems with at least three degrees of freedom with all their intriguing phenomena. If the problem is to avoid chaotic motions, as often is the case, this can be 'enforced' simply by 'clocks', e. g., traffic lights, heart pace makers, etc. By the way, my meta-theory shows that Schrödinger's equation is not limited to quantum mechanics. Quantum mechanics provides just the most prominent instance, I know of at least one macroscopic instance.

Thus, what did you intend to say by the intermediate title: 'Freeing the Mind from the Slavery of Newtonianism'? Not Newton was 'wrong', but all those, who are slaves of professional superstition, not to say of their own ignorance, who after three hundred years still do not understand the implications of Newton's axiomatic model and his law of gravity. Else we would, among others, have a physical theory of gravity, as I have outlined in detail already ten years ago in a number of exposes, all to be found on my website, and 'finally' described in my opus magnum [4].

That the world is only one single 'coherent' system is not a new discovery, but belongs to the most deeply rooted instinctive beliefs of mankind, and is evidently (!) implied by Newton's law of gravity and by Einstein's theory of general relativity. The mass potential constituting physical space depends on all singularities, on all celestial bodies moving 'around'. Concerning this subject I attach copies of letters to the editors of 'Spektrum der Wissenschaft' and 'Scientific American'.

As a consequence precise satellite monitoring and navigation requires typically some thousand bodies to be tracked and accounted for. I quote from my opus magnum: "While in most terrestrial cases the mass potential may be assumed to be stationary, in astronomy and in satellite navigation the motion of the whole (planetary) reference mollusc has to be [and is standardly being] accounted for." Remember, Uranus has been discovered this way!

Concerning Lagrange's equations, namely the partial energy (!) balances, no longer momentum (!) balances, I note, that they also are usually not understood. They can of course be applied in case of non-linear systems with energy dissipation and energy supply. As I told you, Hamilton's equations are nothing more than a degenerate subset, sufficient for most purposes of physicists as their success shows, but insufficient for most engineering problems as discussed at great detail in my opus magnum.

I conclude with a remark on the term 'macroscopic quantum effect' (MQE) you are using. As you will know this term is used in physics for genuine quantum effects, permitting to es-

tablish etalons meeting the requirements of permanent stability and ready availability. I am looking forward to the discovery of a macroscopic effect permitting to establish a mass etalon. The two ways currently being followed cannot possibly provide the 'final' solutions.

With kind regards yours,

Michael Schmiechen.

PS: I hope that in the meantime you had a chance to enjoy Kehlmann's 'Geister in Princeton', the story of Gödel, at the Renaissance Theater, still being performed as I noticed in passing by. And how did you like the 'Logicomix' [5]? With great pleasure I am presently reading 'Wittgenstein's Poker' by Edmond and Eidinow [6].

References

[1] Tennenbaum, Jonathan: Amplitude Quantization as an Elementary Property of Macroscopic Vibrating Systems. 21st Century Science & Technology 18 (2006) 4, 50-63.

[2] Mahr, Bernd: Autorität und Befragbarkeit von Modellen. Abschieds-Vorlesung. Technische Universität Berlin, 13.02.2012.

[3] Magnus, Kurt, Karl Popp und Walter Sextro: Schwingungen. Eine Einführung in die physikalischen Grundlagen und die theoretische Behandlung von Schwingungsproblemen. 8. Auflage. Wiesbaden: Vieweg + Teubner, 2008. 1. Auflage 1961; 3. Auflage 1976.

[4] Schmiechen, Michael: Newton's Principia and related 'principles' revisited. Classical dynamics reconstructed in the spirits of Goethe, [Aristotle,] Euler and Einstein. Elementary Mechanics from an advanced standpoint and vice versa. Second edition of work in progress in three volumes. Copyright: Michael Schmiechen, Berlin, Summer 2009. Herstellung und Verlag: Books on Demand GmbH, Norderstedt. Available as paperbacks and e-books.

[5] Doxiadis, Apostolos, Christos H Papadimitriou (Authors), Alecos Papadatos and Annie Di Donna (Illustrators): Logicomix: An Epic Search for Truth. London: Bloomsbury, 2009. Deutsch von Ebi Naumann: Logicomix: Eine epische Suche nach Wahrheit. Zürich: Atrium, 2010.

[6] Edmonds, David and John Eidinow: Wittgenstein's Poker. The Story of a Ten-Minute Argument Between Two Great Philosophers. Ecco, an imprint of Harper Collins, 2001/2002.