Dear friends, and specialists in the logic(s) of Quantum Mechanics:

Following von Foerster, I consider systemic eigen-solutions as the most basic objects of knowledge. Therefore, studying the essential properties and the process of emergence of eigen-solutions in scientific research constitutes (for me) the foundation of a true constructivist epistemology.

Once upon a time, I stumble on a result stated in Nosov and Kolmanovskii (1986, p.13):

"In a recent paper Zubov has considered the problem of relativistic particle motion in a central field. The equation of motion of this particle is

$$m\ddot{r}(t) = -k\frac{r(t-\tau(r))}{|r(t-\tau(r))|^3} \ .$$

Here r is a vector joining the particle with the immovable center. It is known that in such a system without delay, i.e. for $\tau(r) = 0$, a unique circular orbit passes across every point (x_0, y_0, z_0) of the configuration space. If we allow for the interaction delay, then the situation changes qualitatively. The circular orbits settle on the spheres if and only if their radii verify the quantization conditions

$$\nu(|r|)\tau(|r|) = n2\pi \quad , \quad n = 0, \pm 1, \pm 2, \ldots$$

(These) conditions coincide with Bohr quantization rules."

- V.R.Nosov, V.B.Kolmanovskii (1986). *Stability of Functional Diferential Equations.* London: Academic Press.

- V.I.Zubov (1983). *Analytical Dynamics of Systems of Bodies.* Leningrad University.

I found Zubov's idea astonishingly beautyfull. The eigen solutions of Bohr quantization rule where obtained out of a spherical symmetry constraint, in the formalism of delayed differential equations. This formalism was (for me) such more natural and intuitive than Schrödinger equation. I spend some time trying to get more of the standard eigen-solutions of QM out of this language. My knowledge of delayed differential equations is very limited, so I was not very successful. I also never had access to Zubov's papers.

Do you know if this line of research had continuation? Can any of you get me a copy of Zubov's paper(s) from Leningrad University?

Thank you very much,

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