ZULF EXAMINES REED-SIMON CHAPTER 5 WITH AN EYE TOWARD MAKING SENSE OF MATHEMATICAL PHYSICS WITH FOUR-SPHERE THEORY

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My four-sphere theory will displace the 1900-1930 paradigm theories – i.e. general relativity, quantum mechanics and quantum field theory, and expansionary cosmology. Given this context, I am quite interested in understanding the history of some of the major developments in the theory of Hilbert and Banach spaces and the transformations between them a bit better. Reed-Simon I Chapter VI is the canonical source from my undergraduate years at Princeton 1991-1995. I will be following Reed-Simon almost exactly here and the purpose is a little more than copy and paste. It is just to gain some insight about history and possible changes for four-sphere theory. The following will be from p. 204–205.

The main impetus for the study of compact operators came from the use of integral operators to solve classical boundary value problems of mathematical physics. Let $D \subset \mathbf{R}^3$ and consider the Dirichlet problem

$$\begin{aligned} \Delta u(x) &= 0 \\ u(x) &= f(x) \end{aligned}$$

The task is to solve this problem using the fundamental solution of the Laplacian. The fundamental solution is some $K(x, y)$ so that

$$\Delta_x K(x, y) = 0$$

The idea is then to paste together the solution by taking the boundary values $f(x)$ like this

$$\int_{\partial D} K(x, y) f(y) dx$$

This ought to solve the Dirichlet problem. The entire paraphenalia of *compact operators on Hilbert space* arose from the fact that these operators

$$Tf(x) = \int_{\partial D} K(x, y) f(y) dy$$

are compact self-adjoint operators on Hilbert space.

For me this is quite beautiful and illuminating because I am thinking about the way in which my four-sphere theory, where the fundamental law for all of Nature is the Ahmed-d'Alembert Law on spinor fields of a four-sphere leads to some boundary value problems.

Let me put things in a context that is more important to me. I want to know broadly what sorts of boundary value problems arise in all of Science with four-sphere theory driving all of Nature, and then I want to have the right understanding of the development of the theory of operators on Banach and Hilbert spaces.

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Are we happy only with the theory that exists, for Banach Spaces, Hilbert Spaces, and others defined by seminorms, and these linear operators that are bounded, or unbounded and self-adjoint? What is the totality of four-sphere theory?

All these integral operators are arising because there is a principle of superposition being exploited. We want to understand this superposition in Nature. In one way or another, it is the principle of superposition being an accurate *representation of Nature* that is allowing all of this sort of linear functional analysis power to resolve scientific problems. That is more important than the particular set of boundary value problems that we solve.

1. Solving the Dirichlet Problem

This is such a beautiful analytic construction that I am moved by it, truly profound and beautiful. And it is therefore worthwhile savouring the elements.

We have an open set $D \subset \mathbf{R}^3$ with *smooth boundary* ∂D. We are given $f \in C(\partial D)$. We are asked to find $u \in C(\bar{D}) \cap C^2(D)$ such that

$$\Delta u(x) = 0$$

for all $x \in D$.

We introduce

$$K(x,y) = \frac{\langle x-y, n_y\rangle}{|x-y|^3}$$

These satisfy

$$\Delta_x K(x,y) = 0$$

for various continous functions $\phi \in C(\partial D)$ we note that the function

$$T\phi(x) = \int_{\partial D} K(x,y)\phi(y)dy$$

is a superposition of functions that do satisfy the harmonic condition in the interior.

The key point is that we cannot simply take

$$u(x) = \int_{\partial D} K(x,y)g(y)dy$$

and get the *boundary function* to be $f(x)$ without further analysis.

The analysis that we need to know that if we had defined

$$v(x) = \int_{\partial D} K(x,y)\phi(y)dy$$

this will solve the equation

$$\Delta v(x) = 0$$

for $x \in D$ but the boundary value will not be anything we wish. If $x_0 \in \partial D$ and $x \to x_0$ from the interior, then

$$v(x) \to -\phi(x) + \int_{\partial D} K(x,y)\phi(y)dy$$

So we have a parametrised scheme here where we cannot simply put the boundary value to be whatever we want.

Now we desire a solution with boundary value $f(x)$. Then we have to solve the equation

$$f(x) = -\phi(x) + \int_{\partial D} K(x,y)\phi(y)dy$$

Absolutely gorgeous. We have reduced solving the Dirichlet problem with prescribed boundary condition $f(x)$ now to a problem of solving an integral equation among functions in $C(\partial D)$.

And then we apply the Hilbert space theory on $L^2(\partial D)$ to solve

$$f(x) = -\phi + T\phi$$

with T a compact operator, and then we get a solution to Dirichlet problem.

Now this is truly beautiful mathematical substance, because there was no law of nature that said, "Man shall solve Dirichlet problem with a bit of ingenuity and beautiful organisation of elements."

Let me be quite honest. The world is *fortunate* that I was not in charge of solving the Dirichlet problem in the nineteenth century or developing Hilbert space theory to analyse these. I would have straightforward refused and said, "Look, buddy. I don't get paid enough to solve these sorts of absurdly whimsical problems, okay? Find someone else." But indeed the world was fortunate and did it without my involvement.

2. Perspective Of Four-Sphere Theory

I have literally discovered that absolute space is a scaled four-sphere of radius $R = 3075.69$ Mpc for the first time in the history of the entire human race.

In my model of Nature, the entire physical universe, the only objective existence that Man assumes to be real, is a hypersurface $M(t) \to S^4(R)$ at a given moment in time $t \in \mathbf{R}$. The radius is fixed, and is quantitatively $R = C/h$ for some universal constant $C > 0$ and it is the curvature of the four-sphere $\Lambda = C'h^2$ that is the famous *cosmological constant* $\Lambda = 1.11 \times 10^{-52} m^{-2}$. The four-sphere tells us something that had never occurred to anyone before me, that there is a vast part of the *objective universe*, $S^4(R)$ that is not observed at all by ordinary five senses.

The Dirichlet problem is far deeper than what we appreciate. If we ever want to ever know anything about $S^4(R) - M(t)$, the rest of the universe that we never had any idea existed before my work, we have to rely on solutions to various sorts of equations based on their boundary values in $M(t)$, the physical universe, which is a hypersurface.

The fundamental solution of the Laplacian on a four-sphere is something different than

$$K(x, y) = \frac{\langle x - y, n_y \rangle}{|x - y|^3}$$

but it is not unknown. Let $D \in S^4(R)$ be the 'upper part' of the sphere with $\partial D = M(t)$. Let $f \in C(M(t))$. Thus with minor changes we the solution technique for Dirichlet problem will lead us to the solution of the following problem.

$$\begin{aligned} \Delta_{S^4} u(x) &= 0 \qquad && x \in D \\ u(x) &= f(x) && x \in M(t) \end{aligned}$$

The solution here to the Dirichlet problem will give us values of an arrangement at different point in $S^4(R)$ that are unobservable to us since we live in $M(t)$.

Now the particular equation is less important to the major point that I am making in this section. That point is that there exist some reasonable methods to *determine the configuration of the unobserved part of the universe* using only measurements in the physical universe. This point is more important for four-sphere theory than the particular problem. There are configurations of, for the lack of terminology that is not yet standardised, *electromagnetic matter* in $S^4(R)$ that are not part of the physical universe but yet have indirect physical effects on $M(t)$. This is not speculation but extremely central to Science and to physical phenomena.

We must, in the end understand what sort of things these *electromagnetic matter* are, and have some substantial physical theory to determine them. This is a significant future project for all of Science. The frontier of a fourth spatial dimension is not one that is secondary to physics or to Man's Understanding of Nature of objective existence.

The reign of Materialism is at an end with the rise of my four-sphere theory, for I have exceeded the established Scientific foundations of Materialism once. Man shall be able to understand far more of Nature than have been dreamt of the philosophies of Materialists in the past three and a half centuries.

3. How I Differ From Empirical Materialists Of The Past Ages

I am always in dialogue with the pioneers of Europe's Scientific Revolution in the eighteenth century, at least in my philosophical outlook, and less so with contemporary philosophers of Science. The reasons for this are irrelevant; they have to do with my strong Romantic Era influences from British India background and my strong reverence for Percy Bysshe Shelley's poetry and art.

The eighteenth century gives rise to a materialist philosophy that I am challenging, and this has to do with an Empiricical *fundamentalism*, that sense-data are *sufficient* to understand the nature of objective reality.

I hold that Empirical measurements and observations and experiments are *necessary* for knowledge of objective existence, but strictly insufficient. I am religious and no longer Atheist as I had been between 1979 and 2008, most of my life, but my non-Materialist philosophy of science is not based on my articles and doctrines of faith. They are instead based on my four-sphere theory which posits that *all spinor fields of $S^4(R)$ have objective existence* and all Empirical phenomena in the material world $M(t) \subset S^4(R)$ are measurements of some features of the spinor fields that constitute all that has objective existence.

To make things concrete, you measure the velocity of a baseball in flight. That is measurement of spinor field configuration. You make an error with the electricity meter and short-circuit the electric power in Allen Texas and the refrigerator, television and internet get turned off. Well that's activity with some spinor field configuration.

Measurements of quantities in the materal world $M(t)$ are necessary for knowledge of all things that have objective existence.

On the other hand, there exist in profusion spinor fields whose knowledge is not even in principle available by *any sort of easy measurement in the material world* $M(t)$ and they too are parts of objective existence. And their existence forces me to shun and abandon Empirical Materialist fundamentalism.

This is not an academic issue. This is a fundamental issue about what is the valid way for Man to understand the nature of objective reality. The emphasis is on *objective* reality, i.e. reality that, in principle, could be done by all sorts of electrical gizmos in parts of the universe that are not directly accessible, i.e. $S^4(R) - M(t)$.

Now it might well be that aetherial Angels and Demons and other great gods are all in $S^4(R) - M(t)$. But that is secondary because we're far at the moment from establishing that *anything at all* is in $S^4(R) - M(t)$ let alone extremely precise and complex configurations that happen to appeal to our mythological aesthetic sensibilities.

4. A Step Deeper Into Dirichlet Problem

I began this note to explicate Chapter 6 from Reed-Simon I. But I am moved to gain some appreciation for the history of Dirichlet Problem, for I feel that my education is inadequate here. You see I learned of the Dirichlet problem first from Peter Sarnak, and at that time, we were more interested in eigenfunctions of the Laplacian on compact surfaces and compact manifolds. That aspect has been important to me from 1993. But today I am more interested in the mathematical physics itself. I was reading a beautiful presentation of the Dirichlet Problem by Lars Gårding, an expanded version of a lecture to students at Lund University in Sweden. Of course, Lars Gårding is an extremely talented analyst and you should read him directly.

I am far more interested in my own viewpoint here, which I will base on what I learn from Gårding here. P. G. L. Dirichlet moves from Berlin to Göttingen in 1855, and he had lectured in Berlin on *electrostatics* and *heat conduction*. And Dirichlet Problem was named from work of Bernhard Riemann who had listened to his lectures in Göttingen. Riemann was very interested in electrostatics as well.

If $\rho(x)$ is a charge distribution in $\mathbf{R}^3$, then the electrostatic potential in the part of space without any charges is

$$u(x) = \int \frac{\rho(y)}{|x-y|} dy$$

and furthermore in the space without charges,

$$\Delta u(x) = 0.$$

This is what really interests me. I mean it's truly beautiful the way that various structures of inner products, completion, and functional analysis of Hilbert spaces leads to solving the Dirichlet Problem. Those aspects are fantastic developments. But to me what is more tantalising is the problem itself, of how the solution tells us something about configuration of Nature in regions without charges.

This is most fascinating. You see, I don't know how to know what is out there in $S^4(R) - M(t)$ and I am most pleased with this potential theory sort of thing that these nineteenth century mathematicians and physicists had invented. Fascinating, very interesting indeed. I am most pleased with these Peter Gustav Lejeune Dirichlet and this Georg Bernhard Riemann. Good work you too. Zulf is happy with you.

5. Superposition Principle For S4 Potentials

What Dirichlet was lecturing on was an analytic limit of superpositions of Coulomb potentials from the charges. This may seem very elementary for physicists today, but this is what is interesting for a Scientific Revolutionary like myself. The S4 Potential is almost indistinguishable numerically from the Coulomb Potential.

The S4 Electromagnetic potential for a single charged particle with center $x \in S^4(R)$ is

$$v_x(y) = \frac{C}{|\sin(|x-y|/R)|}$$

where C is some constant. As with analysis convention, I just write C with different value from occurrence to occurrence.

The Dirichlet synthesis for a distribution of charges is

$$v(x) = \int \frac{C\rho(y)}{|\sin(|x-y|/R)|} dy$$

The analogy is exact to the use of superposition by Dirichlet and Riemann in 1855. There is a worry now of course because the potential is not necessarily a fundamental solution for the Laplacian any more and we need care for them.

Well the fundamental solutions of the Laplacian on d-spheres have been studied by Howard Cohl [1]. I won't go into the exact expression now and keep the question open for now: what is the relation between the S4 Electromagnetic Potential and the fundamental solution of Laplace's operator on the four-sphere of radius $R = 3075.69$ Mpc.

This is absolutely central to my hopes for being able to determine the configuration of electromagnetic matter in $S^4(R) - M(t)$, the great frontier of existence that I have opened for my beloved people the human race.

Let us think through these issues a bit more. From within $M(t)$, the physical hypersurface, we could use some sort of gizmo to measure potential at a large number of points. These we hypothesize are due to charge distributions in $S^4(R)$ both on $M(t)$ and in $S^4(R)$. We can generalise this to include magnetic monopoles. Then from these measurements we could attempt to deduce some points $\Omega \subset S^4(R)$ where we have density of (a) electric charges and (b) magnetic charges.

This idea, I propose, will allow the human race to gain further knowledge of objective existence far beyond all that has been learned about things of the material world, i.e. $M(t)$.

Now you might be worried that $M(t)$ is not still. That is true in four-sphere theory but we are used to living in this moving hypersurface already, so there are reasonable ways to handle this. What is new and interesting is how we are going to learn what is *out there* in the universe beyond our ordinary five senses in an objective manner.

Four-sphere theory posits that there is nothing else but spinor fields and magnetic and electric charges in $S^4(R) - M(t)$. These are vast new directions in Science.

6. Qualitative Explanation Of Black Magic And Other Powers That Have Long Distance Physical Effects

Bill Gates exercise of *illegitimate* and *destructive powers* against myself include use of (a) US Industrial Power, (b) US War Power, (c) White Racial Power, and (d) European Black Magic Power to penetrate my Blood Meta, and my Deep Interior in Destructive ways, introduce various Pain Meta, Conquest and Enslavement Meta. How is he able to hurt my *physical health* while he is physically located 2100 miles away? Established science based on QFT/GR/Expansion has no explanation and no explanation are *possible* within the context of these obsolete theories.

However, four-sphere theory, which is a revolution against QFT/GR/Expansion *can provide qualitative explanations.* Until four-sphere theory is further tested, we can only have qualitative explanations that are plausible and nothing more.

What he is doing is *manipulating four-dimensional material constituted of magnetic monopoles* and those lead to his aggressive capabilities. I do not dabble in these things, so I am not an expert. But four-sphere theory is not about horrid exploitation of unexplored phenomena in Nature (by Science at least). Black Magic and these powers are a miniscule and insignificant parts of the four-sphere universe as there is much more, and benevolent understanding that I am inaugurating. Magnetic monopoles cannot be stable in $M(t)$ but they might be quite ubiquitous in $S^4(R) - M(t)$ and while black magic to harm individual bodies and health by long distance methods are horrid and evil things, they are not the only objectively real features of $S^4(R) - M(t)$. They happen to be the features that wretched malevolent worthless miserable good-for-nothing vile hick illiterate sons of bitches like Bill Gates are attracted to. There is an entire universe to be explored here for the positive benefit of my beloved people the human race that I inaugurate with my four-sphere theory.

References

[1] Howard S. Cohl,Fundamental Solution of Laplace's Equation In Hyperspherical Geometry, *SIGMA* 7 (2011), 108–122