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Y. Ok.

B: As I remember what Lie algebra is, there were rules to it. For instance, since these are Lie groups, the set to which we should apply this Lie algebra and in our case this is the set of non-physical individuals, should be a group. This means in mathematical terms, in order for something to be a group there are some rules. For instance, it should have a neutral element into it.

Y: Should have?

B: A neutral element.

Y: Neutral element.

B: Neutral element. Like, for instance, in summarizing we have X + 0 = 0 + X (X plus X) or if we are multiplying Y multiplied by 1 = 1 x 1 by Y = Y so this is... One is neutral element for multiplying and 0 is neutral element for summarizing. So this is a group, this is one of the conditions which are required for a set to be a group. So we must recognize something like this in our set. For instance, in terms of our relations, a neutral element should exist somehow. But this is not the main point; there is something else which is not in favor of lei algebra to be the mathematics of Lila as I had just ten minutes to think about it. As I remember what Lie algebraist were. The first condition was these states should be a group so these things will see a neutral element. So then there is a rule which is actually with the main flavor (of Lie algebras) what makes Lie algebras be Lie algebras. This is this relation we have something like XY + YZ + ZX should be zero. This should be fulfilled somehow…

Y: In order to use Lie algebra.

B: For instance, if X is the state of that acknowledge of Y. For instance we must find the meaning to it. Or Y is in a state of direct knowledge of Z or n because this is just an operator, we could denote another meaning to it. Or Z is in a state of knowledge of X and these should make a circuit. It makes a circle. I don't know. This should be zero. But I still have to find this in the article Don gave to me. I haven't seen it yet but we must find something which resembles this. I'll have just a look. To take more of the time. Maybe in here is something that is implicitly understood.

And this is why Lie algebras has been used in cases when we have non-linear system for which the theory of uniqueness and existence of solution fails. Because if you want to check if the theorem of uniqueness and existence is fulfilled, then you do something like this. For

instance, you have some equations and then you find ΔX ΔY multiplied by ΔY ΔZ + ΔZ ΔT multiplied by ΔT ΔC + ΔC ΔT multiplies by ΔT, and this should be zero. So out of the necessity to find solutions for non-linear systems, in cases when the theorem for existence and uniqueness fails, in order still be able to solve such cases. For instance parking the car, which is solvable clearly but not the way we want to solve it. So in order to solve such cases Lie algebra has been applied. Because in Lie algebra (and I believe; it is how it was invented in the first place) we have this circle, we have XY or YZ or ZX should be zero. Now if you let me. In non-linear systems we deal with so called manifolds. What is manifold? If you have torus and you have here which is three dimensional and you have a surface over the torus. Then this surface is it two dimensional or is it three dimensional? Being a surface it is two dimensional but being con-torus it is thee dimensional. So if you have something here to solve, it will be unsolvable because this theorem of uniqueness and existence would fail. So in these cases if you find ΔX ΔY multiplied by ΔY ΔZ + ΔZ ΔT multiplied by ΔT ΔC + ΔC ΔT multiplies by ΔT so on and so on. This won't be zero. And this. What makes the non-linear system not to be easily solved. The solution is not straight forward but Lie algebras should be engaged. And then they have defined Lie brackets, and these Lie brackets are like brackets on which you support because bracket means both support and parentheses (and bracket). A bracket is both this for supporting a man that couldn't walk, if he needs brackets (crutch), and at the same time this is bracket, so this is why they call this brackets. Now what I am aiming to, in this case, what is Lie algebra? Lie algebra is this manifold and I'll write it mathematically is not lying on the surface of the torus, but it is higher, it is another imaginary realm, to which we come by transformation. By applying this Lie algebra we mirror, we transform the whole of this problem into this another realm for which Lie algebra (Lie brackets) behave a certain way they are not zero. And then they have Lie brackets of second order of third order, there are thick books on Lie algebra. And finally you solve the system here because here it could be solved. For instance, this is a plane and this is described in plane. So the problem in this imaginary realm does not exist anymore. So I solved the problem in this imaginary realm, and then I put it back. I find the opposite transformation, the inverse transformation to it. There is Lie transformation, transforming the regional problem into this realm and there is the other way around like in La Place transformation, then you have inverse transformation to Lie and problem is solved. In this whole operation, for instance, while in robotics when we are dealing with the movement of the robot's hand, in the situation of obstacle. For instance, the robot wants to grab this but this is an obstacle and because the movement of the robot is with one degree of freedom or two degrees of freedom. And the obstacle is in the three dimensional realm the problem is not holonomic. The equation are not to be solved straight forward. Are not straight forward to be solved. And then you apply Lie algebra, but you apply Lie algebra bit by bit. You don't find the whole trajectory but part of the trajectory, then another part and another part. And there is something which is living, what is living is this Hamiltonian. Not in the sense of spanning…

Y: There are different types of Hamiltonian.

B: There are different types of Hamiltonian which are used in particle physics as well. This is optimization of energy or whatever you want to optimize. Maybe speed, maybe energy. For instance, I mentioned tiger, when tiger is running and if his trajectory is observed then it is noticed that first of all he is conserving his energy. He does optimization of speed, but later

on he grows tired and slowly he goes into the pattern of optimization of energy. So Hamiltonian has changed in this trajectory of tiger running. So this is a very complex problem, very complex. I was working on it and do not finish actually because it is endless, While I was at UCLA, I was at UCLA for thirteen months…

Y: UCLA in Los Ángeles?

B: In Los Angeles, yes, when I was starting this.

Y: That's where I was born. Let me ask you a question. Would this be a correct way of applying this? If this were the physical world and you wanted to describe it, could you do it piece by piece like this, using Lie algebra? So you could take it here, make your calculation and bring it back, and say this is the value for this constant?

B: You mean to apply it to Lila or are you talking in general?

Y: I am talking about Lila. In other words, would be avoiding the infinity?

B: If we go to another realm?

Y: Yes and use Lie algebra. This is manifold, I know, but where does Lie come into it?

B: I am just trying to explain to you what Lie algebra is. I don't say at this point that it could be…

Y: I was reading Penrose on it, I read that part. And he said, "Small but not in the infinitesimal." We have small elements like (Dietz?). If they were small enough. If they were smaller than A arrow B, then we ought to be able to use it. Smaller or as equal to the smallest unit of time or the smallest unit of space. I think that in a way that is what we are doing. Yes, I think that is what we are doing.

If we have A arrow B arrow C, what we are doing is taking a smaller element than this whole thing. We just take A arrow B and we take that as one element and this as another one. Then we can solve the problem because both of them are smaller than the whole thing. You see the problem with the infinite calculus. They are using vxdy is that it's infinite. They are infinitesimals, and then you are integrate over that, over the limits. Whereas we want a discrete algebra, and this makes a discrete algebra out of it doesn't it? If I have understood it correctly.

B: In a sense, yes, because it is at least one aspect of it is based on sets and sets are discrete elements. A set is a set of discrete elements.

Y: Right. And they are all in this group. But how, the details of it, I don't know. You will have to look into that for us. Do you think there might be more? In other words, I don't want to be understanding Lie algebra just to be understanding Lie algebra. I want to see if we can use it.

B: You see in Lie algebra you have things like this, for instance, and this is infinitesimal. There are thick books about Lie algebra, you know, they define first what algebra is. For a set to be pronounced an algebra first it should be ring, in order for it to be ring, it should be

group, in order for it to be group, it should have neutral element. And this is a lot of it. There is a whole logic into it, and all these elements should be studied.

Y: And all this would have to be studied, yes. OK

B: OK. Also later on in order to have a really clear insight, because this is very advanced and it is applied to Quantum mechanics. But to know the essentials on Lie algebra, we could check in Encyclopedia Britannica or Encarta. I have those two encyclopedia at my laptop.

Y I have the Britannica here.

B: We might do it now. Open Britannica. Pity this is not a spot for wireless.

Bret: We can setup an ad hoc network any time you want. We can network the machines. I arranged for that. But we don't have internet connection.

B: Because in Britannica, you often they reference to outside links, out going links.

Y: But then Penrose has his section on it.

B: You know when I was writing the first letters to you, I was thinking what to apply. Then I opened *Shadows of the Mind* of Penrose and these particles moving through mirrors he has…

Y: He has an aspect experiment.

B: He has a very nice elegant experiment, proved by his mathematics,

Y: Yes.

B: And it is very easy. And I was thinking how to apply, and that is when I sent to you this wave function. Although if it is correct it is helpful much. I sent you something in these kit brackets, this is another terminology used in Lie algebra. These brackets meaning both support and parentheses, they divide this into bra and kit. So kit is…

Y: Paul Dirac use in his version of quantum theory.

B: Ah, yes, Dirac.

Y: Paul Dirac.

B: Yes, because these are actually like tensors sort of. These are vectors in cubic space.

Y: Huh ha.

B: They are. Are used with kit. And then I don't remember exactly what I wrote, I have imagined some wave function. When I was entering these matrixes I tried to remember. It was like every possible combination or every possible arrangement, although there is a huge number even though finite, of these arrangements.

Y: Arrangements? yes

B: This was the beginning of my observing the matrixes.

Y: I think it is (N) squared factorial, something like that.

B: Yes (N) squared factorial. It is billions of billions of digits. I remember… I tried to remember. It was. I keep it somewhere in my computer, maybe later on. Not to take the time now.

Y: I don't remember it. You sent it to me?

B: I sent it to you. It was like a wave function of some kind. And it was inspired by *Shadows or the mind* of Penrose. But then I realized that it is just… It doesn't lead somewhere, although it might be correct you know.

Y: Here's all your letters are here.

B: Ah, yes, this is the one. These are all possible combinations of arrangements for a finite number of individuals, no matter how big it would be. This is like a Schrödinger's equation, in which possibilities are, this possibility is one possible arrangement of non-denials. This is another possible arrangement of non-denials, another possible arrangement of non-denials. And this could either exist or not. So this wave factor should be either zero or one.

Y: (acknowledges).

B: This is actually correct but what could we do further? I was thinking because Penrose solution was so elegant and so easy to understand.

Y: It is all probabilistic.

B: Yes

Y: Yes. I remember it now.

B: I'm glad we found it.

Don: Well, it didn't appear to be useful.

B: Application to algebra is ( ) groups, a billion group. Ah ha, it said somewhere it should be a billion so we have here a billion groups? But let us look for Lie algebra here. They don't have Lie in the Britannica. A ah, L the homology of the Lie algebras we have. The Lie algebra of the Lie group, the topological structure of the Lie groups.

Don: Which one should I open? (Referring to definition in the computer encyclopedia)

B: Homology of the Lie algebra there. I am trying to find something that resembles this one because this is what I remember, is essential.

Don: Yes, I know what you are talking about, I just…

B: Yes, it is like circles going and this circle should be closed. If it is not closed the problem is not holonomic.

Don: Here, why don't you see what you can find?

B: Basic theory.

Don: Do you have *Deep down things* with you. (Speaking to Bret)

Bret: Probably not.

Don: Because that I believe has a presentation on Lie groups that...

Bret: Since you want it, of course, I don't.

Don: It goes through exactly this. So perhaps you can bring it in tomorrow.

B: *Existence of solution*, this is what I was talking about. *Existence of Solutions*. This leads to Lie algebra. The remainder theorem. But it requires years. I try to remember, if I know someone who has mentioned Lie algebra. Holomorphism.

Bret: How close to Lie algebra, to group theory?

B: We found something, but it is huge, it requires. OK, this is one idea. This is maybe one way to proceed.

Y: It will take some study.

B: Yes. We should recognize this. This is what I remember for sure being essential for Lie algebra. So if we could not see this valid, and it might not be valid because it is not circular. These are all physical. These are all just perceptions of the physical not because always there is one individual in a state of direct knowledgeof another individual. And always with the attribute of who, will be missing.

Y: Maybe we have to change this operator.

B: And to limit it just to the other three attributes.

Y: Chooses or could be in a state of knowledge. I don't know.

B: Because there are two operations here plus and these are multiplied.

Y: (acknowledges).

B: This might mean X in a state of knowledge of Y or we should find something circular. If it is not the case, then Lie algebras are not of use. And actually, this is the most probable answer because they are built for a special reason and this is to breach the impossibility to solve some of the non-linear equations. So they are built for this special reason.

Y: Bi turbulence. Turbulence is very difficult.

B: Turbulence it might be, a non holonomic problem, and probably it is a non holonomic.

Y: OK. You can look into it. Maybe it will work, maybe it won't.

B: Because Lila requires a Lila algebra not Lie algebra but Lila algebra. It requires its own algebra, it is for sure.

Y: OK. Can we go ahead on some other stuff on recursion? OK. First I am going to read to you. On the 30th of May 1999, I wrote this as a rough draft. It is called the Lila Paradigm. Here is the introduction.

> Modern science holds that the only reality is matter particles enduring through time and related across space. Science holds that this independent material reality is the basis of everything including beings that somehow can be conscious and appear to have the power of choice. The Lila theory is meant to supercede this fundamental belief of modern science. Also the Lila theory is meant to supercede the basic tenants of religious belief: that there exists a God or Divine principle and that it is the source of everything including beings that can be conscious and can have some degree of the power of choice.
>
> The Lila theory replaces these beliefs by reversing the sequence, so that the individual beings can be conscious and have some power of choice are the basis of everything. These individual beings appear in each others' consciousness as matter particles where the relations of time and space between the matter particles are determined by the choices of all the individual beings. Science has no idea how consciousness might arise out of what science thinks is inherent matter. When science is baffled by how choice can originate since science holds that there is only automatic cause and effect between particles of matter.
>
> As mentioned most religions believe that the consciousness and choice that beings have are created by God or by a numinous principle. But what choice is there if God can un-create these beings and their choices at an instant? In contradiction to this, most of us have our own subjective first person experience of being conscious and of having at least some power of choice. These are self-evident. The Lila theory says that what each of us is, is one of these not-created individual beings that can be conscious and have some power of choice. Since the individual beings are not material and only appear to each other as all material things, what the reader is, what all individual being are, is not a human body or any part of such a body, or any of its functions. And according to the Lila theory, one is not consciousness itself or any part of the mind. One is that which may or may not be in a conscious state of the content of one's mind or via the sense organs of the body the material world.

That is the first part of the introduction. Here I have taken a slightly different approach than I have taken in the other points that I have read to you. To try and give you my overall thinking about how do we approach this. It's one thing to write a technical paper, another one to write one that give people a grasp of what it's about. Tomorrow I'll read a technical paper on computing the mass ratios.

B:OK.

Y: I sent that off to a journal and they didn't even reply. OK, Poor Charles, nobody pays any attention to him--except Biljana.

B: They will pay attention.

Y: That's good for me. It gets me over all my bad karma. Now recursion, we did some work. You want to lay some of these out for you to look at. Just the main, the three main ones.

That’s one of them, that’s another, and then this one. These three are for you. I have them memorized.

B: And these.

Y: Ah, later. All of them later. In radical theories. In section seven called, C*hronicle of Events.* I’m …