Re: An Invitation to Quantum Mathematics

Source: http://sci.tech−archive.net/Archive/sci.math/2006−11/msg04267.html

---

* *From*: "Mpilot" <mobilepilot@xxxxxxxxx>
* *Date*: 15 Nov 2006 11:48:56 −0800

Let me try to clarify the above given statements.

It turns out that fundamental notions and results of classical mathematics do have substantial quantum analogues. You can say that these classical notions represent a small classical part of a huge quantum iceberg. To comprehend all of this iceberg we must replace functions lying in the foundation of the notions (results, methods, problems) with operators. The question is how to perform such quantization in practice for a concrete notion taken from some area of mathematics. Often it is not clear in advance what to do and different people can give you different suggestions.

However, some conformity has been established. For instance, the book by Connes is especially impressive. It is a main source for quantum mathematics.

Let me concentrate on the theory of normed spaces. There are no other normed spaces, but function spaces. Thus every normed space coincides with some space of bounded functions endowed with the uniform norm. Being spaces of functions automatically become spaces of operators.

The essential new phenomena of quantum mathematics appear when we move from lineair operators to multilineair operators. In principle, the relations between quantum and classical functional analysis are similar to those between quantum and classical physics. On one hand, the things in classical science (notions, facts, methods) have meaningfull quantum analogues, which allow to better understand their classical prototypes. On the other hand, quantum science comes across essentially new phenomena not encounted in classical sience.

Timothy Golden BandTechnology.com wrote:

> Mpilot wrote:
>
> > Quantum Mathematics is the mathematical apparatus of quantum mechanics.
> >
> > What is the essence of this mathematical ideology ?

> We can say quantum mathematics emerges from the classical mathematics after replacing functions by operators. The outstanding role of functions in classical mathematics with the pointwise commutative multiplication is passed in quantum mathematics to operators with their non−commutative multiplication (composition).
>
> The following 2 statements serve as a "guide to action":
> * Classical Mathematics deals exclusively with spaces of functions and its main structure is the uniform norm.
> * Quantum Mathematics deals with the spaces of operators and the main structure is the quantum norm.

Will you please discuss Jx, Jy, and Jz ?

−Tim

.