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Phys 453 project

Brief Review of Hilbert Space

In classical physics, we define the state of a system by a vector \vec{S} in the phase space Γ . Such that the components of that vector are the positions and momenta of the particles making the system. However, in quantum mechanics, we define the state of the system by a vector Ψ in the Hilbert space \mathcal{H} .

In this project, you need to read the given references and summarise the basic points about the use of Hilbert space in quantum mechanics. You need to include the following points:

1. What is a Hilbert space ?
2. The space L^2 .
3. Properties of Hilbert space and their use in quantum mechanics.

You should include the references in your project

- Hassani, Sadri. *Mathematical physics: a modern introduction to its foundations*. Springer Science & Business Media, 2013. (Chapter 5).
- Armin Scrinzi. *Why we do quantum mechanics on Hilbert spaces*. 2012

Best Regards,

Dr Salwa Alsaleh