

Degeneracy

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Dear Members,

in P.29 of Sakurai's Modern Quantum Mechanics, he counts some difficulties about degeneracy: " In such a case the notation $|a\rangle$ that labels the eigenket by its eigenvalue alone does not give a complete description; furthermore, we may recall that our earlier theorem on the orthogonality of different eigenkets was proved under the assumption of no degeneracy. Even worse, the whole concept that the ket space is spanned by $\{|a\rangle\}$ appears to run into difficulty when the dimensionality of the ket space is larger than the number of distinct eigenvalues of A. Fortunately, in practical applications in quantum mechanics, it is usually the case that in such a situation the eigenvalues of some other commuting observable, say B, can be used to label the degenerate eigenkets."

1-why, in principle, these are difficulties?

2-I don't understand the last difficulty, i.e. " even worse, the whole concept that the ket space ..."

3-I don't understand his " fortunately, in practical applications

... .

4-All these problems and difficulties are resolved by using the eigenvalues of some other commuting observables, say B? How?
cheers,

Ali

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- Prev by Date: [***Re: Why physicists should pay attention to the mind***](#)
- Next by Date: [***Expectation Value***](#)
- Previous by thread: [***Re: A question of discrete space-time.***](#)
- Next by thread: [***Expectation Value***](#)
- Index(es):
 - ◆ [***Date***](#)
 - ◆ [***Thread***](#)