In[1]:=
```
(* :Author: Diego Sarceño *)
(* :Date: March 07, 2022 *)
(* :Description: Package with useful routines in quantum mechanics *)
BeginPackage["qmDS`"]

ObservableEV::usage="ObservableEV[SqMatrix,Eigenvalue] gives de set of eigenvectors
Proyector::usage="Proyector[Vector] constructs the ket-bra using the same vector."
ExpectationValue::usage="ExpectationValue[SqMatrix,State] gives the expectation val
Conmutator::usage="Conmutator[SqMatrix1,SqMatrix2] constructs the conmutator betwee
GeneralProbability::usage="GeneralProbability[SqMatrix,State,Eigenvalue] gives the
```

In[7]:=
```
Begin["`Private`"]
(* ObservableEV *)
ObservableEV[SqMatrix_,EigValue_]:=Eigenvectors[SqMatrix][[Flatten[Position[Eigenvalues
```

Out[7]= qmDS`Private`

In[9]:=
```
(* Proyector *)
Proyector[Vector_]:=Outer[Times,Vector,Conjugate[Vector]]
```

In[10]:=
```
(* ExpectationValue *)
ExpectationValue[SqMatrix_,State_]:=Conjugate[State] . (SqMatrix . State)
```

In[11]:=
```
(* Conmutator *)
Conmutator[SqMatrix1_,SqMatrix2_]:=SqMatrix1 . SqMatrix2 - SqMatrix2 . SqMatrix1
```

In[12]:=
```
(* GeneralProbability *)
GeneralProbability[SqMatrix_,State_,Eigenvalue_]:=Plus@@(
```

$$\frac{(\text{Abs}[\#.\text{State}]^2)}{\text{Norm}[\#]^2*\text{Norm}[\text{State}]^2}\&/@\text{Obse}$$

In[13]:=
```
End[];
EndPackage[]
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