20191110—Compare_Qobj()_basis()

February 3, 2020

1 20191110—Compare_Qobj()_basis()

2 Comparing ——- Qobj() - basis()

[1]:
```
from qutip import *
```

[2]:
```
Qobj()
```

[2]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 0.0 \end{pmatrix}$$

[3]:
```
basis()
```

```
␣
↪---------------------------------------------------------------------------

       TypeError                                 Traceback (most recent call␣
↪last)

       <ipython-input-3-e8e348c201bd> in <module>
   ----> 1 basis()


       TypeError: basis() missing 1 required positional argument: 'N'
```

[4]:
```
Qobj([])
```

```
␣
↪---------------------------------------------------------------------------

       IndexError                                Traceback (most recent call␣
↪last)
```

```
        <ipython-input-4-f5186996d1ba> in <module>
   ----> 1 Qobj([])


        ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in␣
↪__init__(self, inpt, dims, shape, type, isherm, copy, fast, superrep,␣
↪isunitary)
        279                                             shape=_tmp.shape)
        280             if not np.any(dims):
   --> 281                 self.dims = [[int(data.shape[0])], [int(data.
↪shape[1])]]
        282             else:
        283                 self.dims = dims


        IndexError: tuple index out of range
```

[5]:
```
basis([])
```

```
      ␣
↪---------------------------------------------------------------------------

        ValueError                                Traceback (most recent call␣
↪last)

        <ipython-input-5-9d6400ca8237> in <module>
   ----> 1 basis([])


        ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
         97     """
         98     if (not isinstance(N, (int, np.integer))) or N < 0:
   ---> 99         raise ValueError("N must be integer N >= 0")
        100
        101     if (not isinstance(n, (int, np.integer))) or n < offset:


        ValueError: N must be integer N >= 0
```

[6]:
```
Qobj([[]])
```

[6]:
```
Quantum object: dims = [[1], [0]], shape = (1, 0), type = bra
```

( )

[7]:
```
basis([[]])
```

```
      ␣
↪---------------------------------------------------------------------------

       ValueError                                Traceback (most recent call␣
↪last)

       <ipython-input-7-48bf53505ab5> in <module>
   ----> 1 basis([[]])


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
        97     """
        98     if (not isinstance(N, (int, np.integer))) or N < 0:
   ---> 99         raise ValueError("N must be integer N >= 0")
       100
       101     if (not isinstance(n, (int, np.integer))) or n < offset:


       ValueError: N must be integer N >= 0
```

[8]:
```
Qobj(0)
```

[8]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 0.0 \end{pmatrix}$$

[9]:
```
basis(0)
```

```
      ␣
↪---------------------------------------------------------------------------

       ValueError                                Traceback (most recent call␣
↪last)

       <ipython-input-9-1f6e4b276558> in <module>
   ----> 1 basis(0)


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
       103
```

```
    104     if n - offset > (N - 1):  # check if n is within bounds
--> 105         raise ValueError("basis vector index need to be in n <= N-1")
    106
    107     data = np.array([1], dtype=complex)


ValueError: basis vector index need to be in n <= N-1
```

[10]:
```
Qobj([[0]])
```

[10]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 0.0 \end{pmatrix}$$

[11]:
```
basis([[0]])
```

```
␣
↪---------------------------------------------------------------------------

ValueError                                Traceback (most recent call␣
↪last)

<ipython-input-11-b9d9ed289167> in <module>
----> 1 basis([[0]])


~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
     97     """
     98     if (not isinstance(N, (int, np.integer))) or N < 0:
---> 99         raise ValueError("N must be integer N >= 0")
    100
    101     if (not isinstance(n, (int, np.integer))) or n < offset:


ValueError: N must be integer N >= 0
```

[12]:
```
Qobj([0])
```

```
␣
↪---------------------------------------------------------------------------

IndexError                                Traceback (most recent call␣
↪last)
```

```
        <ipython-input-12-2ae6782fac20> in <module>
    ----> 1 Qobj([0])


        ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in␣
↪__init__(self, inpt, dims, shape, type, isherm, copy, fast, superrep,␣
↪isunitary)
        279                                             shape=_tmp.shape)
        280             if not np.any(dims):
    --> 281                 self.dims = [[int(data.shape[0])], [int(data.
↪shape[1])]]
        282             else:
        283                 self.dims = dims


        IndexError: tuple index out of range
```

[13]:
```
basis([0])
```

```
      ␣
↪---------------------------------------------------------------------------

        ValueError                                Traceback (most recent call␣
↪last)

        <ipython-input-13-92636425743a> in <module>
    ----> 1 basis([0])


        ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
         97     """
         98     if (not isinstance(N, (int, np.integer))) or N < 0:
    ---> 99         raise ValueError("N must be integer N >= 0")
        100
        101     if (not isinstance(n, (int, np.integer))) or n < offset:


        ValueError: N must be integer N >= 0
```

[14]:
```
Qobj(1)
```

[14]:

```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 1.0 \end{pmatrix}$$

[15]:
```
Qobj([1])
```

```
␣
↪---------------------------------------------------------------------------

       IndexError                                Traceback (most recent call␣
↪last)

       <ipython-input-15-4a3d7641281f> in <module>
    ----> 1 Qobj([1])


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in␣
↪__init__(self, inpt, dims, shape, type, isherm, copy, fast, superrep,␣
↪isunitary)
       279                                             shape=_tmp.shape)
       280             if not np.any(dims):
    --> 281                 self.dims = [[int(data.shape[0])], [int(data.
↪shape[1])]]
       282             else:
       283                 self.dims = dims


       IndexError: tuple index out of range
```

[16]:
```
Qobj([[1]])
```

[16]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 1.0 \end{pmatrix}$$

2.1 Finally Qobj() must contain Qobj([[ ]]) i.e Qobj() = Qobj([[ ]])

[17]:
```
Qobj(0)
```

[17]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 0.0 \end{pmatrix}$$

[18]:
```
Qobj([[0]])
```

[18]:

```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 0.0 \end{pmatrix}$$

[19]:
```
Qobj(2)
```

[19]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 2.0 \end{pmatrix}$$

[20]:
```
Qobj([[2]])
```

[20]:
```
Quantum object: dims = [[1], [1]], shape = (1, 1), type = bra
```

$$\begin{pmatrix} 2.0 \end{pmatrix}$$

[21]:
```
Qobj(2,5)
```

```
␣
↪---------------------------------------------------------------------------

TypeError                                 Traceback (most recent call␣
↪last)

<ipython-input-21-05dd66284613> in <module>
----> 1 Qobj(2,5)


~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in␣
↪__init__(self, inpt, dims, shape, type, isherm, copy, fast, superrep,␣
↪isunitary)
    338             self.superrep = superrep
    339         else:
--> 340             if self.type == 'super' and self.superrep is None:
    341                 self.superrep = 'super'
    342


~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in type(self)
   1984     def type(self):
   1985         if not self._type:
-> 1986             self._type = type_from_dims(self.dims)
   1987
   1988         return self._type
```

```
       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\dimensions.py in␣
↪type_from_dims(dims, enforce_square)
        63
        64 def type_from_dims(dims, enforce_square=True):
   ---> 65     bra_like, ket_like = map(is_scalar, dims)
        66
        67     if bra_like:


       TypeError: 'int' object is not iterable
```

[22]:
```
Qobj(5,2)
```

```
      ␣
↪---------------------------------------------------------------------------

       TypeError                                 Traceback (most recent call␣
↪last)

       <ipython-input-22-3b8cf3f8a62f> in <module>
   ----> 1 Qobj(5,2)


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in␣
↪__init__(self, inpt, dims, shape, type, isherm, copy, fast, superrep,␣
↪isunitary)
       338             self.superrep = superrep
       339         else:
   --> 340             if self.type == 'super' and self.superrep is None:
       341                 self.superrep = 'super'
       342


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\qobj.py in type(self)
      1984     def type(self):
      1985         if not self._type:
   -> 1986             self._type = type_from_dims(self.dims)
      1987
      1988         return self._type


       ~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\dimensions.py in␣
↪type_from_dims(dims, enforce_square)
        63
        64 def type_from_dims(dims, enforce_square=True):
```

```
---> 65     bra_like, ket_like = map(is_scalar, dims)
     66
     67     if bra_like:


TypeError: 'int' object is not iterable
```

[23]:
```
Qobj([[2,5]])
```

[23]:
```
Quantum object: dims = [[1], [2]], shape = (1, 2), type = bra
```

$$\begin{pmatrix} 2.0 & 5.0 \end{pmatrix}$$

[24]:
```
basis(2,5)
```

```
␣
↪---------------------------------------------------------------------------

ValueError                                Traceback (most recent call␣
↪last)

<ipython-input-24-ad8273754655> in <module>
----> 1 basis(2,5)


~\Anaconda3\envs\qutip-env\lib\site-packages\qutip\states.py in basis(N,␣
↪n, offset)
    103
    104     if n - offset > (N - 1):  # check if n is within bounds
--> 105         raise ValueError("basis vector index need to be in n <= N-1")
    106
    107     data = np.array([1], dtype=complex)


ValueError: basis vector index need to be in n <= N-1
```

[25]:
```
basis(5,2)
```

[25]:
```
Quantum object: dims = [[5], [1]], shape = (5, 1), type = ket
```

$$\begin{pmatrix} 0.0 \\ 0.0 \\ 1.0 \\ 0.0 \\ 0.0 \end{pmatrix}$$

[ ]:

[ ]:

[ ]: