

# **|toqito>**

An open source Python library for studying various objects in quantum information.

---

Vincent Russo

April 4th, 2018



- toqito (Theory of Quantum Information Toolkit).
- Open source Python library for studying objects in quantum information.
- More “computer science” and “math” focused. Less “physics” focused.

Quantum information consists of *states*, *channels*, and *measurements*:

- States: Data to be processed.
- Channels: Operations to perform.
- Measurements: Result of applying the operations on data.

States, channels, and measurements.

- These ingredients can all be represented as matrices with specific properties.
- In some ways, toqito is a glorified linear algebra module.



## States: Bras and kets

Standard basis ket vectors are given as  $|0\rangle$  and  $|1\rangle$  where

$$|0\rangle = [1, 0]^T \quad \text{and} \quad |1\rangle = [0, 1]^T$$

```
>>> # Create |0> vector.  
>>> from toqito.states import basis  
>>> basis(2, 0)  
[[1]  
 [0]]
```

## States: Well-known states

# States: Properties

---









```
class LogisticRegression(linear_model.LogisticRegression):  
  
    def __init__(self, *args, **kwargs):  
        super(LogisticRegression, self).__init__(*args, **kwargs)  
  
    def fit(self, data_x, target_y):  
        # Basil's magic formula
```