Quantum Andor Functions

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In this paper I present a quantum function that is "almost" constructible using pure functions plus extensions of non-determinism using random sources.

A quantum andor function is a semi quantum non-deterministic function `f`:

$f : () \to \mathbb{B}^2$ $\exists_{pc}f : \mathbb{B}^2 \to \mathbb{C}$

f : [semi_quantum] true
and · f : [semi_quantum] true
or · f : [semi_quantum] true "and" + "or" = "andor"

For more information about semi quantum functions, see paper "Semi Quantum Non-Determinism".

The complex probability distribution can be generated with two arbitrary basis vectors `a` and `b`:

00	01	10	11
a	b	-b	a

$|a| = |b|$

$a : \mathbb{C}$
$b : \mathbb{C}$

The only partial observations that can distinguish a quantum andor function from some function constructed with pure functions plus extensions of non-determinism using random sources:

(= 01) · f Measure for `01`
(= 10) · f Measure for `10`

These two partial observations give the same real probability distribution:

0	1
¾	¼

With other words, `01` and `10` is given 25% chance of being observed, respectively.

All other functions of type `$\mathbb{B}^2 \to \mathbb{B}$` corresponds to the intuition that `f` is constructible using:

```
f() = if random() < 0.5 { 00 } else { 11 }
```

This intuition gives `01` and `10` a 0% chance of being observed, which is a contradiction. Therefore, quantum andor functions are not constructible using pure functions plus extensions of non-determinism using random sources. However, they are "almost" constructible.