

## Catuskoti in Dependent Existence

In this construct, I choose to interpret Catuskoti in the realm of existence. Later I will use this formalism to discuss characteristics of dependent existence.

By “existence” I refer to the existence of thought-objects. Thought-objects are pieces of knowledge constructed by mind with or without the aid of sensory organs. I propose that given any thought-object, A, four alternative existences can be defined according to Catuskoti as;

$E_A$	$\emptyset_A$
1	0
0	1
1	1
0	0

Where,  $E_A$  means A exists and  $\emptyset_A$  means A does not exist. Each alternative existence of the thought-object is called a valid state of that thought-object. Thought-objects are not absolute realities and they do not exist permanently although they may be perceived as real and permanent in the conventional sense.

### Postulate 1:

It is assumed that in the *conventional world*, only ( $E_A=1, \emptyset_A=0$ ) and ( $E_A=0, \emptyset_A=1$ ) states (i.e. two fold existence) are valid. This rule will be used to extract the view of the *conventional world* in the ensuing analysis.

I wish to analyze the dependent existence of two thought-objects; A and B using the four fold formalism. It is assumed that the existences of A and B are interdependent, i.e. neither A nor B exist independently. The goal is to find the valid states of A and B in a causal relationship.

We consider two causal relationships:

- i.  $A \rightarrow B$ . A and B has a linear relationship. i.e. B is conditioned by A.
- ii.  $A \leftrightarrow B$ . A and B has a cyclic relationship. i.e. B is conditioned by A and A is conditioned by B.

### Postulate 2:

For  $A \rightarrow B$ , the rules of interactions between A and B are as follows:

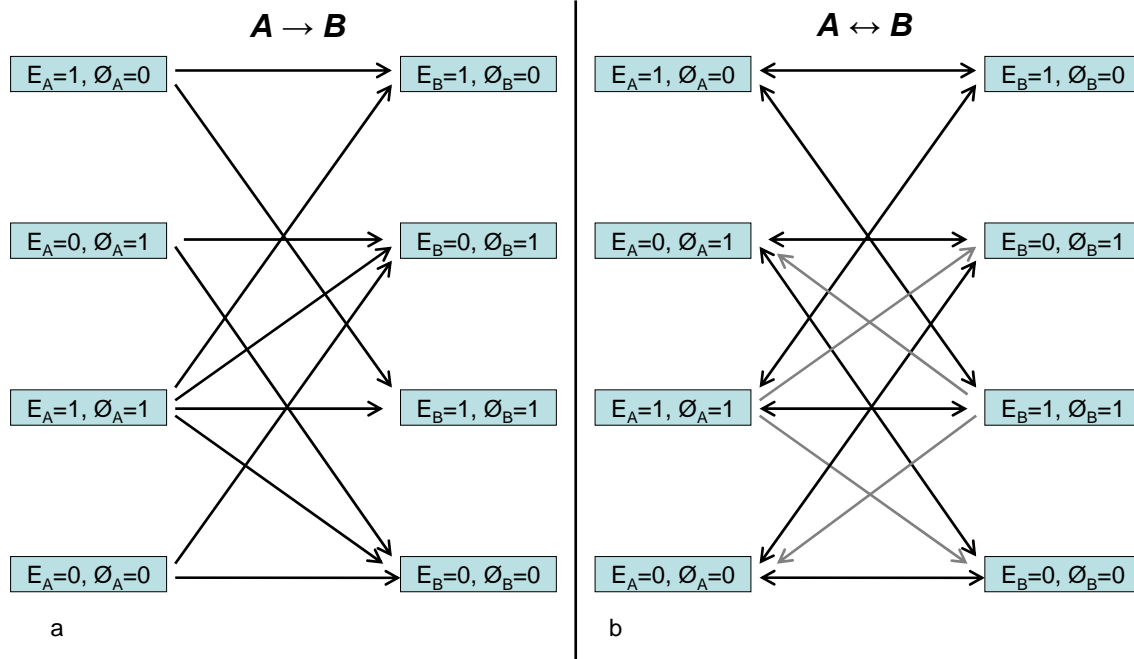
- i. If  $E_A=1$ , B can be in any state where  $E_B=1$
- ii. If  $E_A=0$ , B can be in any state where  $E_B=0$
- iii. If  $E_A=1 \wedge \emptyset_A=1$ ,  $E_B$  can be either 1 or 0.

Although these rules are somewhat intuitive they do not follow from any fundamental concept and needs to be further examined. For now I will accept them as true.

There are 16 possible states between any two thought-objects. **Figure 1a** shows graphically which different states of B are invoked by the states of A according to the rules stated above. In this case (i.e.  $A \rightarrow B$ ), there are 10 valid states out of 16 possible permutations. To determine the valid states in the *conventional world*, we extract a subset of states that obey the rule: (IF  $E_X=1$  THEN  $\emptyset_X=0$ ) OR (IF  $E_X=0$  THEN  $\emptyset_X=1$ ) according to Postulate 1 and we get,

$E_A$	$E_B$
1	1
0	0

This is not surprising and is identical to results obtained in a two fold existence for  $A \rightarrow B$  using the same rules of interactions.



**Figure 1.** Modes of interactions between the states in  $A \rightarrow B$  (a) and in  $A \leftrightarrow B$  (b)

Let us now consider the cyclic relationship,  $A \leftrightarrow B$ . The rules governing this relationship are the same as before but are now applied with respect to both A and B.

We could simply start with **Figure 1a** and add arrows from B states to A states representing “A conditioned by B” following the same rules in Postulate 2. After consolidating, we get a symmetric structure of interaction as given in **Figure 1b**. The valid states in  $A \leftrightarrow B$  are determined by the connectivity between A states and B states. i.e. if a state of A can be mapped to a state of B or vice versa through one or more connecting paths, such combined state is considered valid. It is easy to see in this case that all 16 possible states are valid. Again following the same rule in Postulate 1, the valid states in  $A \leftrightarrow B$  in the *conventional world* become,

$E_A$	$E_B$
1	0
0	1
1	1
0	0

Compared to the linear relationship, in a cyclic relationship now we have two additional states (1,0) and (0,1).

Results obtained in this analysis are intriguing for several reasons. In a two-fold existence, there can only be (1,1) or (0,0) states of existence between two thought-objects regardless of the type of causal relationship between them. Whereas in a four fold existence at least two types of relationships (there could be more): Linear and Cyclic, with differing states of existence can be defined.

Most importantly, result of this analysis show that in contrast to a linear relationship, in a cyclic relationship, there is a valid state where one of the two thought-objects ceases to exist in the conventional world. (Following postulate 1, we can simply interpret  $E_A=1$  as A exist and  $E_A=0$  as A doesn't exist; strictly in the *conventional world*). The relevance of this state may become evident in concrete examples.

Let's consider the motion of a particle subjected to its own internal forces. Two thought-objects relevant to this particle are its position, X and its momentum P. Given that there are no external forces acting on the particle, one could imagine that the two thought-objects, X and P are conditioned by each other and that they are in a cyclic relationship. In such case, according to our analysis there could be a state where X or P ceases to exist, leading to the familiar interpretation of the uncertainty principal, which could not be explained by two fold existence. However this still doesn't give a meaning to the (1,0) or (0,1) states in a cyclic relationship; such meaning may come through thought-objects related to living things.

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