

Re: Cantor and the binary tree

Source: <http://sci.tech-archive.net/Archive/sci.math/2005-05/msg05403.html>

- *From:* mueckenh@xxxxxxxxxxxxxxxxxxxx
 - *Date:* 29 May 2005 08:38:05 -0700
-

Dik T. Winter wrote:

> In article <1117175027.610055.60140@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>
 mueckenh@xxxxxxxxxxxxxxxxxxxx writes:
 >> Dik T. Winter wrote:
 > ...
 >>>> 4) Any node increases the number of paths by 1 from 1 coming in, to 2
 >>>> going out. $2 - 1 = 1$.
 >>>>
 >>> Eh? Now you are talking about an ever increasing finite tree, not about
 >>> an infinite tree. If you are talking about an infinite tree it may be
 >>> allowable, but because the number of paths is infinite, so it stays the
 >>> same when you add 1 to it.
 >>
 >> Quite wrong! I consider an infinite tree.
 >
 > What do you mean when you write "any node increases the number of paths by 1",
 > etc. when you are talking about an infinite tree?

n tree

```

0 0.
/\
1 0 1
/\ /\
2 0 1 0 1
^^ ^^ ^^
.....
```

Every path starts at 0. at level $n = 0$ and does never end.
 Every path is isomorphic to a real number of $(0,1)$.
 Every path exists in that tree but not every path can be distinguished
 at level n from every other path.
 Every node increases the number of paths which are visible, at level n ,
 as being different from each other.
 This property can be utilized to set up a bijection between nodes and
 paths as follows:

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Every path which distinguishes itself from the others by branching off to the right hand side is bjected to that node where this happens.
Every path which distinguishes itself from the others by branching off to the left hand side is considered to be the continuation of the incoming one.

Examples.

Path 0,1000...is mapped on the node on level $n = 0$.

Path 0,01000... is mapped on the left node on level $n = 1$.

In this way all numbers (except $0 = 0.000\dots$) which differ from all other numbers by at least one digit are mapped on the nodes.

Regards, WM

- **Follow-Ups:**

- ◆ **Re: Cantor and the binary tree**

- ◆ *From:* Dik T. Winter

- ◆ **Re: Cantor and the binary tree**

- ◆ *From:* Virgil

- **References:**

- ◆ **Re: Cantor and the binary tree**

- ◆ *From:* mueckenh

- ◆ **Re: Cantor and the binary tree**

- ◆ *From:* Dik T. Winter

- ◆ **Re: Cantor and the binary tree**

- ◆ *From:* mueckenh

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