

Re: Peano's space-filling curve

Source: <http://sci.tech-archive.net/Archive/sci.math/2004-07/3617.html>

From: Daniel Grubb (grubb_at_lola.math.niu.edu)

Date: 07/14/04

Date: 14 Jul 2004 14:24:04 GMT

>> *A is a set; that means it has some things that we
>> call elements, some > things are elements of A
>> and some things are not. That's all you need to know.*

>*I can conceive of this, but then I encounter a new problem.
>It always seemed to me that the domain of a function and
>the rule that linked it to the codomain were inextricably
>linked, with the set comprising the domain determining which
>rules were applicable, while a given rule might only be
>relevant to a certain class(es) of sets. If the domain was a
>set of the names of famous people, then the rule 'has a
>birthday on' can map the name to a codomain of 366 Julian
>days, while the rule 'multiply by two' is meaningless.
>However, its inverse 'multiply by 1/2' is not incompatible
>with the codomain. Similarly the first mentioned rule is
>meaningless when applied to a domain of integers while its
>inverse 'is the birthday of' can be applied to integers, as
>long as these represent Julian days.*

OK. Maybe you are ready for the formal definition of a function.

Let A and B be sets. Any sets at all. A function $f:A \rightarrow B$ is a subset $f \subseteq A \times B$ with the following two properties:

- 1) If $a \in A$, then there is a $b \in B$ with $(a,b) \in f$.
- 2) If $a \in A$, and $b_1, b_2 \in B$ with $(a,b_1) \in f$ and $(a,b_2) \in f$ then $b_1 = b_2$.

In other words, a function f is a collection of ordered pairs so that every $a \in A$ has exactly one $b \in B$ with $(a,b) \in f$. We give this unique b the name $f(a)$.

In essence, this identifies the intuitive idea of a function with its graph.

--Dan Grubb