Re: Question: Given |X|>0 and |Y|>0, can X x Y be empty?

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- *From*: Scott <ToaTerra@xxxxxxxxx>
- *Date*: Fri, 03 Aug 2007 23:43:57 −0000

On Aug 3, 4:00 pm, magi...@xxxxxxxxxxxxxxxxx (Arturo Magidin) wrote:

> In article <1186161736.517279.72...@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
>
> > Let f be a function f:S −> P(S).

....

> So, you are saying in Prop 4: if p is an element of P(S), then there is a function (with domain where?) whose image includes p.
>
> Better:
>
> If p in P(S), then there exists f(p) : S−>P(S) such that p is in the range of f(p).

I was trying to define the domain and codomain of any f by the single sentence. I can see that was a mistake. The better sentence should be:

If p in P(S), then there exists f(s) : S −> P(S) such that p is in the range of f(s).

> > Proof: If p in P(S), then (As in S)((s,p) in M) [Prop 3]. Let f(s) = p <−> (As in S)((s,p) in M).
>
> This is lousy. Are you trying to define f as "constant p"? Then DO SO. What you write here is pretty near unintelligible, close to

As a constant function − yes. I thought that is what I was defining: for any p in P(S), there exists a constant function f(s) = p. I was showing this function exists because its a subset of M.

nonsense. Since (s,q) in M for all s in S and all q in S(p), your condition on the right ALWAYS holds, so it does not define a function. Your "function" is in fact "assign to each element of S every element of P(S)" and that is not a function.

No, the other way around: for each p define a function f_p that maps every element of S to one element of P(S). To use your notation below:

(Ap)(let f_p(s) = { (s,p) in M })

Perhaps you can educate me on the correct way to say this?

f is functional

No, it is note. Your definition makes f = M, and that is in general not a function.

Example: Given f: {0, 1, 2} −> {cat,dog} where f = { (0,cat), (1,cat), (2,cat) } why is this not functional and total?

Let A = { x in S : x notin f(x) }.

What f? The one you define in Prop 4 for a given p, or the one we

At this point, any f. Since I am trying to make this general, I am not restricting which f.

So, let f be an arbitrary function, f:S−>P(S). It need not be equal to f(p) for any p in P(S), i.e., it may not be the conditional one we have from Proposition 4.

Correct, it can be any f, not necessisarily the one from Prop 4.

Given f, we define A_f to be

A_f = { x in S : x notin f(x) }.

Okay, I can see this is better.

This is simply Cantor's Argument.

From what I read, Cantor's Argument deals with surjective functions. I

am claiming there are *no* functions with A_f in the range including simple ones constructed with finite sets.

From Prop 4 and the contrapositive, ~(Ef)(A_f in range(f)) −> A_f notin P(S).

Wrong. Proposition 4 was incorrect and does not refer to the same f as proposition 5. Here is your mistake, born out of that LOUSY notation where you use f to mean many different things at the same time.

Can you explain this a bit more. Prop 5 applies to any function, including the function in Prop 4. Given ~(Ef)(A_f in range(f)) isn't it true that ~(A_{f(s)} in range(f(s))?

Proposition 4 says:

(Ap) (p in S(p) −>
(Ef(p))(f(p):S−>P(S), f(p) is a function,
and (Ex)(x in S and f(p)(x)=p)))

Err,no. It says:

(Ap)(p in S(p) −>
(Ef(s))(f(s):S −> P(S), f(s) is a function, and (Ax)(x in S and
f(s)=p).

Question: Would it have been a whole lot clearer if I constructed the proofs using just the one function from Prop 4?

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