Re: Adjunction Spaces

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- *From*: "Justin Young" <x_static66@xxxxxxxxxxx>
- *Date*: Sat, 25 Jun 2005 23:07:40 GMT

"Per Vognsen" <per.vognsen@xxxxxxxxx> wrote in message
news:1119737173.093819.275700@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
>
> Per Vognsen wrote:
>> Justin Young wrote:
>> > "Per Vognsen" <per.vognsen@xxxxxxxxx> wrote in message
>> > news:1119734311.268170.14220@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
>> > > Justin Young wrote:
>> > >> I am trying to prove that the restriction of q to Y is an embedding.
>> > >> The
>> > >> proof of this when A is closed is straightforward. I'm not
>> > >> completely
>> > >> sure
>> > >> it's true, but have been unable to find a counterexample.
>> > >>
>> > >> Clearly q is injective and continuous. The only issue is showing
>> > >> that it
>> > >> takes closed sets in Y to closed sets in q(Y) (or open sets). I have
>> > >> not
>> > >> been able to show this. The main problem I'm having is that q(Y) is
>> > >> a
>> > >> subspace of a quotient space.
>> > >
>> > > It is a general fact that quotient maps are open, i.e. they take open
>> > > sets to open sets.
>> >
>> > Maybe your defintion of quotient maps differs from mine.
>> > A map p is a quotient map if and only if (p^−1(U) is open if and only
>> > if U
>> > is open.)
>>
>> Of course, I'm not sure what I was thinking. After further
>> consideration, I'm convinced that A indeed needs to be closed for the
>> proposition to hold in general. I mean, if A is open and f is such that
>> f(A) is open in Y then won't q(Y) be non−Hausdorff in general? If you
>> take Y to be Hausdorff, this should constitute a counterexample.
>
> Explicit counterexample along these lines: Take X = (0,1), Y = [0,1]

> and let f be the natural injection. Then the point corresponding to X
> in the quotient space cannot be separated from 0 or 1 by open sets.
>
> Per
>

the spaces X and Y are supposed to be disjoint, so it's easier to take
Y = [1,2].
Since you seem to the define f on all of X, I assume that means that A = X.
But then A is closed in X, so the quotient map will be closed when
restricted
to Y.

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- ***References***:
    - ***Adjunction Spaces***
        - *From:* Justin Young
    - ***Re: Adjunction Spaces***
        - *From:* Per Vognsen
    - ***Re: Adjunction Spaces***
        - *From:* Justin Young
    - ***Re: Adjunction Spaces***
        - *From:* Per Vognsen
    - ***Re: Adjunction Spaces***
        - *From:* Per Vognsen

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