Re: Double limits at the infinity.

Source: http://sci.tech−archive.net/Archive/sci.math/2005−07/msg03465.html

- *From*: "Amanda" <sca18@xxxxxxxxxx>
- *Date*: 21 Jul 2005 13:01:28 −0700

I'm not sure if this is related to what you asked, but there's a condition that implies the existence of the double limit. Suppose that for every x there exists Ly(x) = lim (y −> oo) (f(x,y) and that there exists L = lim (x −> oo) Ly(x). In addition, suppose the "function of functions" f(x,y) converges uniformly to Ly, in the sense that, for every eps>0, there exists a real K, depending only on eps, such that, if y > K, then |f(x,y) − Ly(x)| < eps for every real x. This implies the double limit exists and equals L, that is, for every eps >0, there exists A such that x > A and y> A implies |f(x,y − L| < eps.

Im not quite sure, but I think this also implies the existence of the function Lx(y) = lim (x−> oo) f(x,y) and that lim (y −> oo) Lx(y) = L.

Amanda

David C. Ullrich escreveu:
> On Thu, 21 Jul 2005 13:46:25 +0200, Jesús Cid−Sueiro
> <jcid@xxxxxxxxxxx> wrote:
>
> >Given function f(x,y) I would need to know under which conditions over
> >f, the limit of f as x,y go to +infinity does not depend on the way to
> >go, for instance
> >
> >lim_{y−−>inf} lim_{x−−>inf) f(x,y) =
> >lim_{x−−>inf) lim_{y−−>inf} f(x,y) =
> >lim_{x−−>inf} f(x,x) =
> >
> >
> >I guess that the above relations are true if the limit exists, f is
> >continuous and df(x,y)/dx and df/dy always go to zero as x and y go to
> >+inf (in any way).
> >
> >Is this correct?
>
> I'm not sure what you mean by "the limit exists".
>
> Of course if you mean "if lim_{(x,y) −> (inf,inf)} f(x,y)
> exists then the answer is yes, all the above are equal.
> But that's probably not what you mean, since that's

> pretty obvious, and also has nothing to do with the
> conditions on the derivatives.
>
> If you mean
>
> ">I guess that the above relations are true if
> lim_{y−−>inf} lim_{x−−>inf) f(x,y) exists, f is continuous
> and df(x,y)/dx and df/dy always go to zero as x and y go to
> +inf (in any way)"
>
> then the answer is no.
>
> >Jesús.
>
>
> **********
>
> David C. Ullrich

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- ***References***:
  - ♦ ***Re: Double limits at the infinity.***
    - ◊ *From:* David C . Ullrich

- Prev by Date: ***Re: conditional probability***
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