

Re: Double limits at the infinity.

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- *From:* israel@xxxxxxxxxxxx (Robert Israel)
 - *Date:* 21 Jul 2005 21:16:27 GMT
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In article <db01uj\$ph0\$1@xxxxxxxxxxxxxxxx>, Jesús Cid-Sueiro <jcid@xxxxxxxxxxxx> 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 $+\infty$ does not depend on the way to
>go, for instance
>
> $\lim_{y \rightarrow \infty} \lim_{x \rightarrow \infty} f(x,y) =$
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A sufficient condition is that $L = \lim_{(x,y) \rightarrow (\infty, \infty)} f(x,y)$ exists, i.e. for every $\epsilon > 0$ there is N such that whenever $x > N$ and $y > N$, $|f(x,y) - L| < \epsilon$.

>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
> $+\infty$ (in any way).

>Is this correct?

No (if by "the limit" you mean the three limits you mentioned).
Consider, say, $f(x,y) = \arctan((x-y)/\sqrt{x+y})$.

Robert Israel israel@xxxxxxxxxxxx
Department of Mathematics <http://www.math.ubc.ca/~israel>
University of British Columbia Vancouver, BC, Canada

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