

Re: concept of test function in calculus

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- *From:* luca.pamparana@xxxxxxxx
 - *Date:* Thu, 18 Oct 2007 14:21:55 -0700
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On Oct 18, 10:03 pm, Virgil <vir...@xxxxxxxxxxxx> wrote:

In article <1192740679.519486.213...@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>,

luca.pampar...@xxxxxxxx wrote:

Hi everyone,

I was reading about the dirac delta function which is defined as an impulse which has infinite magnitude at $x = 0$ and is 0 everywhere else.

However, when I look at the mathematical equation describing it on wikipedia and other books, it is as follows:

$$\int_{(-\infty, +\infty)} f(x) \delta(x) dx = f(0)$$

I thought $\int_{(-\infty, +\infty)} \delta(x) dx = 1$ should be sufficient.

What is this $f(x)$ function and why is it used? Wikipedia says it is some sort of a "test function" but I am not sure as to what it means!

I would be grateful if someone could explain this to me.

Re: concept of test function in calculus

Thanks,

Luca

I think that what they are saying is that the del function has the property that that for every function $f(x)$ defined on \mathbb{R} ,
 $\text{Integral } (-\text{inf}, +\text{inf}) f(x) \text{ del}(x) dx = f(0)$

Or at least that it holds for every function on \mathbb{R} which is bounded on some neighborhood of 0.

Hello Virgil,

Thanks for the reply. I guess that makes sense.

I have one more question and that might sound stupid and it is probably due to my dodgy calculus knowledge.

I can see why the intergral of $f(x)$ at $x = 0$ is 1 because the area of the dirac function is 1. However, how come the area of the curve everywhere else has become zero as well? So, how come the curve only has an area under the origin?

I actually wonder if this question makes sense at all...

Thanks again,

Luca

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