Re: Proof of ordered powerset

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From: Jon Slaughter (*Jon_Slaughter_at_Hotmail.com*)
Date: 03/21/05

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Date: Mon, 21 Mar 2005 09:44:59 -0600
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"David C. Ullrich" <ullrich@math.okstate.edu> wrote in message
news:oejt31911k04uvc71000e03qtlffc8ltsa@4ax.com...
> On Sun, 20 Mar 2005 19:54:04 −0600, "Jon Slaughter"
> <Jon_Slaughter@Hotmail.com> wrote:
>
>>
>>"David C. Ullrich" <ullrich@math.okstate.edu> wrote in message
>>news:or4r319uuhvc63onlr4dg7jcvniuq9tbi5@4ax.com...
>>> On Sat, 19 Mar 2005 09:35:00 −0600, "Jon Slaughter"
>>> <Jon_Slaughter@Hotmail.com> wrote:
>>>
>>>>
>>>>"M.J.T. Guy" <mjtg@cus.cam.ac.uk> wrote in message
>>>>news:d1ha3p$6n3$1@gemini.csx.cam.ac.uk...
>>>>> Jon Slaughter <Jon_Slaughter@Hotmail.com> wrote:
>>>>>>Anyone know of an elegant proof of \sum(k!*nCk,k=0..n) = floor(e*n!),
>>>>>>that
>>>>>>involves only arithematic?
>>>>>
>>>>> Not sure what you mean by "involves only arithematic", but try
>>>>> comparing
>>>>> the sum on the left with the first n terms of the series expansion
>>>>> of e*n!.
>>>>>
>>>>>
>>>>> Mike Guy
>>>>
>>>>Well, what I ment was an elementary proof(one that doesn't use
>>>>"advanced"
>>>>concepts like integration, the gamma function or hypergeometric series,
>>>>etc... actually, anything that doesn't really involve calculus)).
>>>
>>> Looking below it seems you don't want any sort of infinite anything
>>> involved. I don't think you can even _define_ e using the sort
>>> of thing you're allowing.
>>>
>>> Or maybe you can: What definition of e did you have in mind

>>> when you asked the question?
>>>
>>
>>yeah, I'm not sure either ;/
>
> If you can't tell me what _definition_ of e you have in mind then
> your question simply makes no sense at all − before we can prove
> anything about e we need to know what e _is_.
>
>
>
> ************************
>
> David C. Ullrich

heh, I don't know what e is ;/ How else can you define what e is without some limiting process? Does the necessarily mean that you cannot find the solution to the original series without using some infinite limiting process? The series is finite, so surely one doesn't have to bring in an infinite process? My answer of floor(e*n!) is simply the truncation of an infinite process to produce the original finite series, but does that mean there are not other answers that do not require an "infinite process"? Since, AFAIK, all irrationals come about through some limiting process... while we might write sqrt(2), that is only an expression for an infinite process. But does that mean that for my original finite series, that the solution must be represented using an infinite process? Well, e*n! is infinite, but floor(e*n!) is not... Overall, floor(e*n!) can be handled without computing e*n! in the infinite by simply taking n!*floor(e*10^k)/10^k(for e, n in base 10) for some k.

Basicaly, I guess what it boils down to, is if I gave you the series

sum(k!*nCk,k=0..n)

and I asked what the "answer" was. The answer I'm looking for is something that itself is finite and involves no inherent infinite processes(i.e., one wouldn't say that 3*5 involves an infinite process, but sqrt(2)*5 would, and floor(sqrt(2)*5) involves an "inherent" infinite process(well, not quite sure exactly how to express what I want to say, since one could also treat 3*5 as an infinite process, but...)).

For example, one could write 0,1,0,1,0,1,... many ways... such as

1/2*((−1)^k + 1) or sin^2(k*Pi/2)

but the first one involves a finite process and the second an "inherent" infinite process. Just because the second one happens to simply to a finite process for special arguments doesn't mean that its not expressed by using something that "normally" takes an infinite process to "compute".

Another example would be to compute the area of a square with sides s, s^2 or int(int(1,x=0..s),y=0..s)?

In my eyes, I see a huge difference between the two representations, the first one is the most simplest and doesn't involve any "natural" "infinities" while the second one does, but happens to reduce to something that doesn't as a special case... replace the 1 with a cos(x)*sin(y)+zeta(x*y) and then what?

I don't know if what I'm saying makes sense or not, but I'm just looking for a "natural" non−infinite solution to the series, if possible. No reason in particular, just that I was hoping for a simple solution since those "types" of series tend to have them.

Again though, I don't think one has to explicitly bring in the infinite process e in... while the solution might look more complex, it should still be possible to be represent it in a "finite" way. Such as, it might be possible use

(1 + 1/m)^m*n!

for some m(n)

in this case, the solution would not infinite an "hidden" infinities. While I haven't messed aroudn with trying to find m, maybe there is even a more simple way?

Thanks

Jon