Re: Capacitor and Force

Source: http://sci.tech−archive.net/Archive/sci.electronics.design/2007−10/msg02844.html

- *From*: Jon Slaughter <Jon.Slaughter@xxxxxxxxx>
- *Date*: Tue, 16 Oct 2007 04:31:32 −0000

On Oct 13, 9:54 pm, The Phantom <phan...@xxxxxxx> wrote:

> On Sun, 14 Oct 2007 00:19:18 GMT, "Jon Slaughter"
>
> <Jon_Slaugh...@xxxxxxxxxxx> wrote:
>
> <SNIP>

> It sounds to me like you don't know much about what your talking about.
> True
> you see see my problem after you found a site that did a similar example but
> from your first post
>
> "
>
> F = k*(CV)^2/r^2
>
> So for a ceramic capacitor of 20nF with V = 20V, F ~= 3.6N.
>
> The (CV)^2 term alone has a value of 16*10^(−14), so the force can't be
> anywhere near 3.6N"
>
> is just utter nonsense and says you have no idea what your talking
> about(because its basic algebra to see your wrong). Shit, there are two
> other factors involved there yet you completely ignore them like they have
> no effect(and it really only takes r)

I already admitted that I did in fact fail to look closely at the expression you had there. I mistakenly assumed that it was the correct expression for the force between parallel plates, and I knew from previous experience that the force couldn't be as large as you calculated. I knew that the (CV)^2 term would dominate (in the correct expression) in spite of the fact that there are other terms. I showed this in another post.

> But even if I ignore that as a lapse of ignorance there still ist he problem of you tossing the term volume integerals around like it means something. Believe me, I do know that any time your doing with any type of object and you are computing something over that object you must integrate(even if its a point).
>
> But since you throw it around willy nilly it sounds like you actually never computed one or you would know that its not an easy thing and in general can
> only be done numerically. Now this case we have a nested integeral and so its going to be 10 orders of magnitude more difficult except in special cases where there is a high degree of symmetry(the highest being a point).
>
> Again though, since you seem to love doing volume integerals I'd like to be shut up by having you compute the one above(for all I know you might be able
> to do it but I seriously doubt it). Of course I'm sure if you do do it then you will make some approximation somewhere(such as the normal force is constant everywhere) and you might actually be able to do it. (but I want to see it in the general case that I described above).
>
> Its one thing to be able to toss these terms around but do you actually have any practical experience with them?
>
> Again, my first approximation, when corrected, is not bad at all. (it would be worse for extremely small r of course). So I'm glad you brought what you said to my attention so I could correct the approximation but I hope you see that its not wrong(after all its an approximation). But I hope you realize that your volume integerals are not as ubiquiteous as you think. Whats the point of using the volume integerals if you cannot compute them. (sure you

> can do it numerically but in this case it is actually somewhat difficult because of the time complexity in the general case(since its 6 integerals))
>
> Usually one starts with a first order approximation and moves on when they need better approximations. I have mine with my corrected approximation. Its good enough for what I am doing. Maybe later I'll try to find a better one or use the ones that already exist for constant force. In any case I want you do solve the surface integerals I have since you seem to think they are easy.
>
> When did I ever say that they are easy? Any particular one might be, or it might not be, but I didn't say anything about that.
>
> Anyway, the appropriate surface integral solution to the parallel plate problem is given in:
>
> http://mysite.du.edu/~jcalvert/phys/caps.htm
>
> and there's no need for me to duplicate it.
>
> I'm sorry to say I don't think I can help your further.

Of course you can't... Cause you probably don't even know what an integral is. That site uses an approximation. It assumes that the plates are infinite in size then chops them down. It does that to get rid of the fringe effects. This is why it is much easier to do it there way. You can do the same thing with the integrals but then IT IS AN APPROXIMATION. EVERYTHING IS AN APPROXIMATION.

The fact of the matter is, that all you did was bring to my attention that I made a mistake by showing me someone else's work that but you have not actually done any mathematical work yourself and have made several blunders that make me think you even have problems with simple algebra.

I figured you wouldn't attempt the integrals... even writing it as a surface integral has an impossible solution(well, AFAIK)... but you have tried to make it sound so easy to do with all your talk of volume integrals. My approximation and thought process was actually correct but I made a mistake in my formula... once that mistake was corrected it is actually a very decent approximation. All you did was bring that to my attention, which I'm thankful... but you have also tried to make yourself out to be someone that actually knows whats going on. I have as to yet see you do any work except search the internet and found an exercise that someone else did to demonstrate my initial

formulation was in error and claim a bunch of crap that you most likely have no clue about.

There were two others that actually formulated the approximation from that site before you but I did not spend enough time to think about why my formulation was in error. There was also the problem of using ceramic caps which I was in error also. But fixing the error and taking into account how ceramic caps work fixes my formula for a rough approximation.

In any case it doesn't matter much any more... this thread isn't going anywhere anymore.

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