PHYS-512 PS2

#1

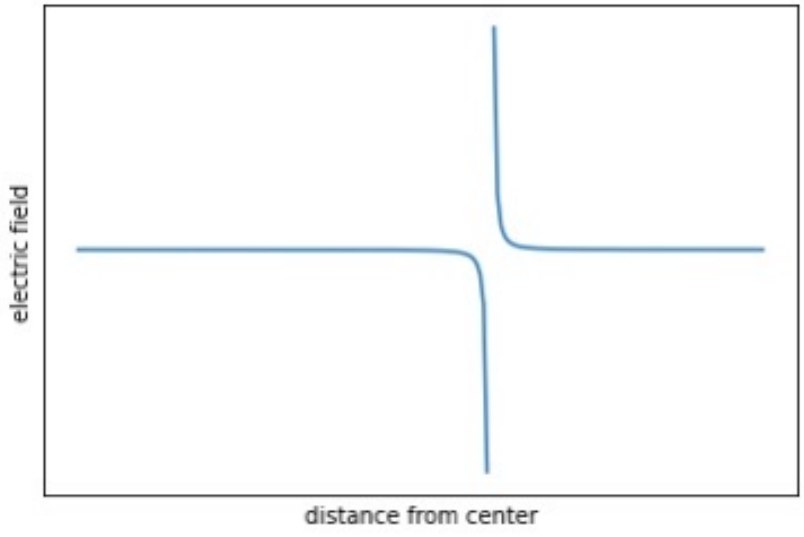
$$E_z = \frac{1}{4\pi\varepsilon_0}(2\pi R^2\sigma)\int_{-1}^{1}\frac{z - Ru}{(R^2+z^2-2Rzu)^{3/2}}\,du$$

↓ constant

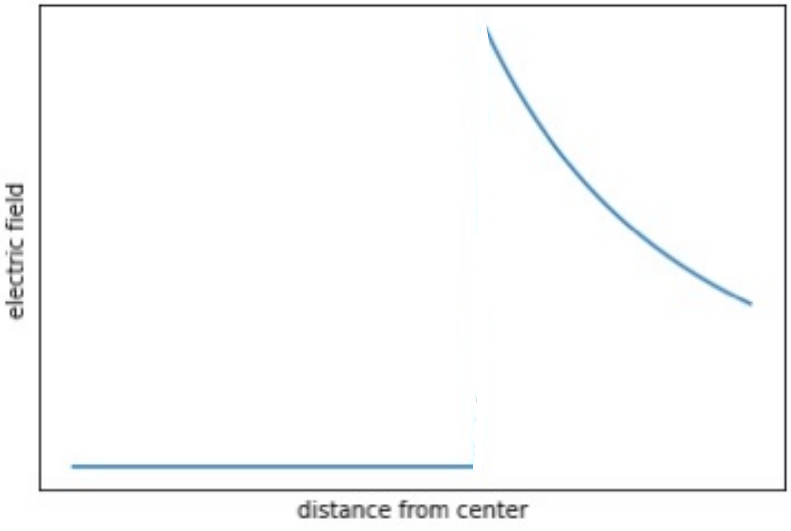
integral solved in this question

Yes, there is a singularity at $z = R$.
Quad does not care.
My integrator (using Simpson's rule) displays significant inaccuracy when z approaches R.

My integrator (Simpson's Rule & Trapezoid yield similar results)



quad



#2

60% of the function calls for evaluation at a point x are saved, as for every 5 points, 3 of the function evaluations are recorded and used in the next recursive call.