

PHYS-512 PS2

#1

$$E_z = \frac{1}{4\pi\epsilon_0} (2\pi R^2 \sigma) \int_{-1}^1 \frac{z - Ru}{(R^2 + z^2 - 2Rzu)^{3/2}} du$$

↓
constant

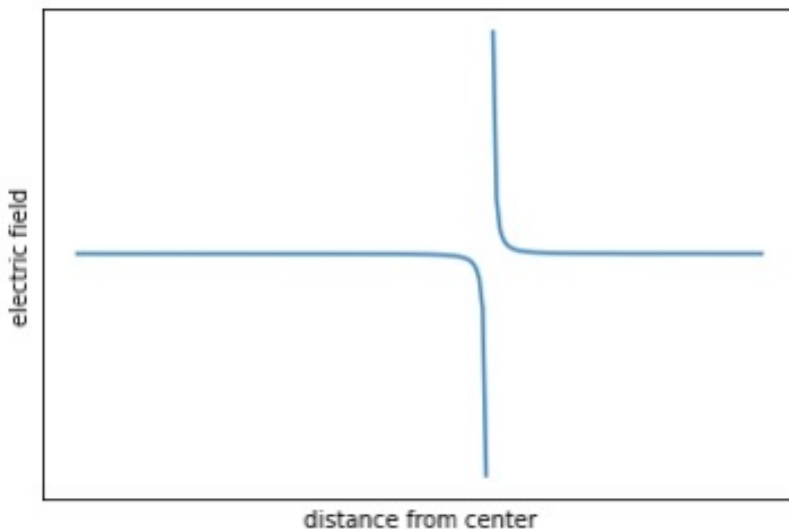
integral solved in this question

Yes, there is a singularity at $z = R$.

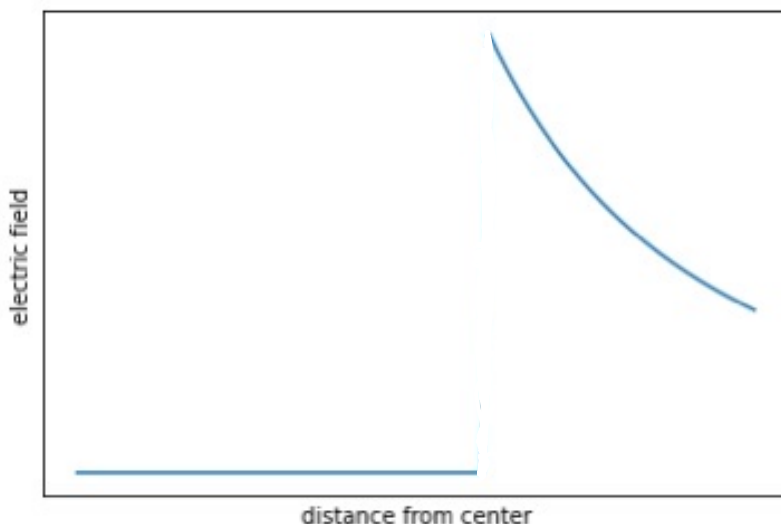
Quad does not care.

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.

#3

6 terms are needed, as the maximum error from the truncated higher-order terms is 1.5674×10^{-6} (calculated by $\sum_{n=M+1}^N |c_n|$).