

[1]

From Griffiths 2.7, we have our desired expression for the electric field a distance  $z$  away:

$$E(z) = \frac{R^2 \sigma}{2 \epsilon_0} \int_0^\pi \frac{(z - R \cos \theta) \sin \theta}{(R^2 + z^2 - 2Rz \cos \theta)^{3/2}} d\theta$$

~ shell radius

For our own integrator, we have to skip  $z = R$  to avoid blow up  
Python's quad function doesn't care!

We get something like:

