

ME01: Uniformly Charged Hemisphere on Axis [50 points].

Find the electrostatic field on the central axis (called “axis” in the figure) of a hemisphere, only for points inside the hemisphere. The hemisphere, which has radius R , is characterized by a uniform charge distribution with constant volume density ρ . Basically, you need to find the field on the axis’ points between 0 and R . For this problem, you must use Coulomb’s law and integration and you must show in reasonable detail the integration procedure; you are not allowed to solve the integral with any numerical aid (i.e., you need to solve it manually). [45 points] *Hint: We strongly recommend dividing the hemisphere in thin disks normal to the axis.*

Can you use the result along the axis for the field on points outside the axis? [5 points]

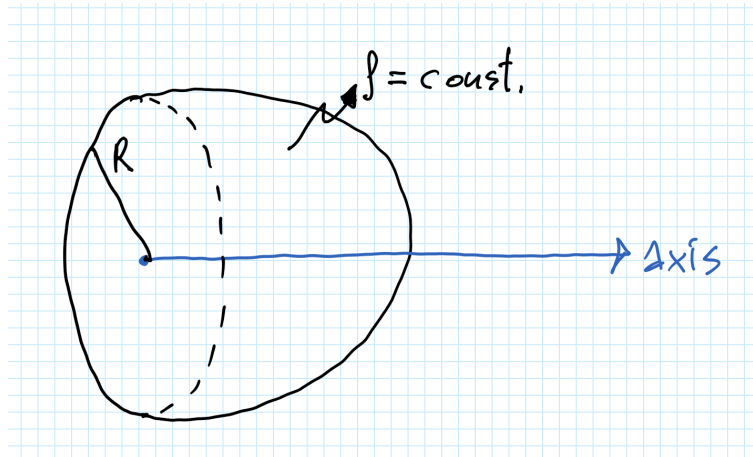


Figure M1