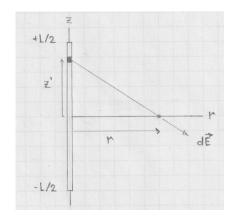# [lex1] Electric field of a charged rod I

Calculate the electric field of a uniformly charged rod of length L at points in a plane perpendicular to the rod that intersects it into two equal parts. The line charge density (charge per unit length) is λ. Start from the general expression in [lln5] for the electric field of a continuous charge distribution. Then simplify that expression systematically by using (i) a convenient coordinate system, (ii) symmetry, and (iii) reduced dimensionality. Infer from the general result asymptotic expressions for a field point close to the rod and a field point far away from the rod showing different power-law dependences on distance.

Solution: