# 1 Electric Field of a Finite Line

Consider the finite line with a uniform charge density from class.

(a) Write an integral expression for the electric field at any point in space due to the finite line. In addition to your usual physics sense-making, you must include a clearly labeled figure and discuss what happens to the direction of the unit vectors as you integrate.Consider the finite line with a uniform charge density from class.

(b) Perform the integral to find the $z$-component of the electric field. In addition to your usual physics sense-making, you must compare your result to the gradient of the electric potential we found in class. (If you want to challenge yourself, do the $s$-component as well!)