Problem statement Suppose $C$ is the part of the parabola $x = -y(y - 1)$ connecting $(0, 0)$ to $(0, 1)$ as shown. Compute

$$\int_C \left( e^{x^2} + 5y + 3 \right) dx + (x^2 + 5y^3) dy.$$

Comment A direct computation is unreasonable. Use Green’s Theorem to compute a double integral and then also compute another simpler line integral. These results can be used to find the value of the line integral requested.