

Automatic Differentiation Exercise

1. Partial Derivatives

(a) Determine, by hand, the partial derivatives of the function:

$$f(x, y) = e^x(x^2 + y^2)^3$$

$$\frac{\partial f}{\partial x} =$$

$$\frac{\partial f}{\partial y} =$$

(b) Use the formulas from from (a) to determine the following values:

- $f(0, 2) =$

- $\frac{\partial f(0, 2)}{\partial x} =$

- $\frac{\partial f(0, 2)}{\partial y} =$

2. Draw a computation graph for the function from (a) above. Show all intermediate values for both the forward and backward pass with $x = 0, y = 2$. You should be able to check your answers against the values you calculated in part (b).