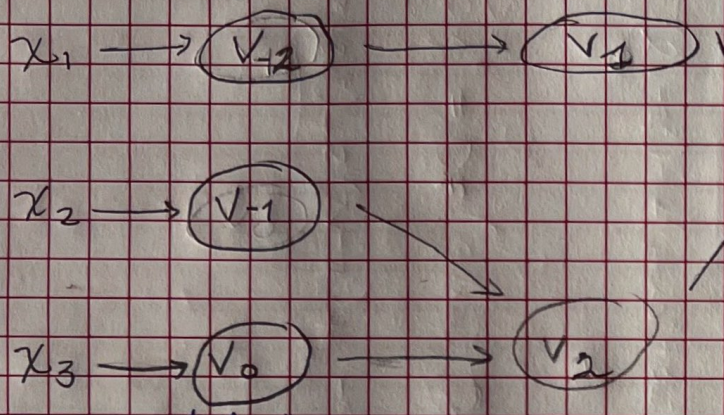
Tarea 1 parte 6

$$f(x_1, x_2, x_3) = 3(x_1^2 + x_2 x_3)$$



Hacia Adelante:

$x_1 = 2, \quad x_2 = 3, \quad x_3 = 4$

$v_{-2} = x_1 = 2$

$v_{-1} = x_2 = 3$

$v_0 = x_3 = 4$

$v_1 = (v_{-2})^2 = 4$

$v_2 = (v_{-1})(v_0) = (3)(4) = 12$

$v_3 = (v_1) + (v_2) = 4 + 12 = 16$

$v_4 = 3(v_3) = 3(16) = 48$

$y = v_4 = 48$

Diferenciación con "Reverse mode"

Semilla $\bar{y} = 1$, $\frac{\partial f}{\partial x_1}$

$\bar{v}_4 = \bar{y} = 1$

$\bar{v}_3 = \bar{v}_4 \frac{\partial v_4}{\partial v_3} = (1) \frac{\partial}{\partial v_3}(3 v_3) = (1)(3) = 3$

$\bar{v}_2 = \bar{v}_3 \frac{\partial v_3}{\partial v_2} = (3) \frac{\partial v_3}{\partial v_2}(v_1 + v_2) = (3)(1) = 3$

$\bar{v}_1 = \bar{v}_3 \frac{\partial v_3}{\partial v_1} = (3) \frac{\partial v_3}{\partial v_1}(v_1 + v_2) = (3)(1) = 3$

$\bar{v}_0 = \bar{v}_2 \frac{\partial v_2}{\partial v_0} = (3) \frac{\partial v_2}{\partial v_0}(v_{-1})(v_0) = (3)(v_{-1}) = (3)(3) = 9$

$\bar{v}_{-1} = \bar{v}_2 \frac{\partial v_2}{\partial v_{-1}} = (3) \frac{\partial v_2}{\partial v_{-1}}(v_{-1})(v_0) = (3)(v_0) = (3)(4) = 12$

$\bar{v}_{-2} = \bar{v}_1 \frac{\partial v_1}{\partial v_{-2}} = (3) \frac{\partial}{\partial v_{-2}}(v_{-2})^2 = 3[2(v_{-2})] = 3[2(2)] = 12$

$\bar{v}_{-2} = x_1 = \frac{\partial f}{\partial x_1} = 12$