

# Machine Learning

## Funcionamiento de las Redes Neuronales



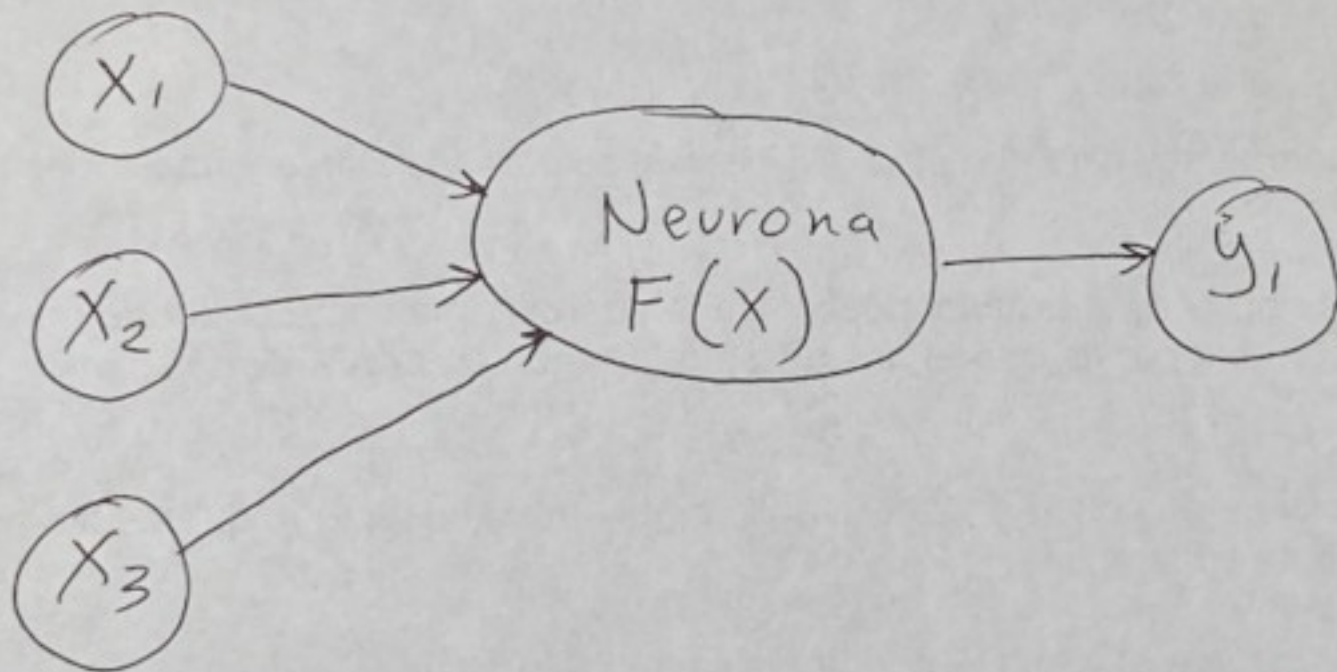
Rogelio Ferreira Escutia

Profesor / Investigador  
Tecnológico Nacional de México  
Campus Morelia



Funcionamiento

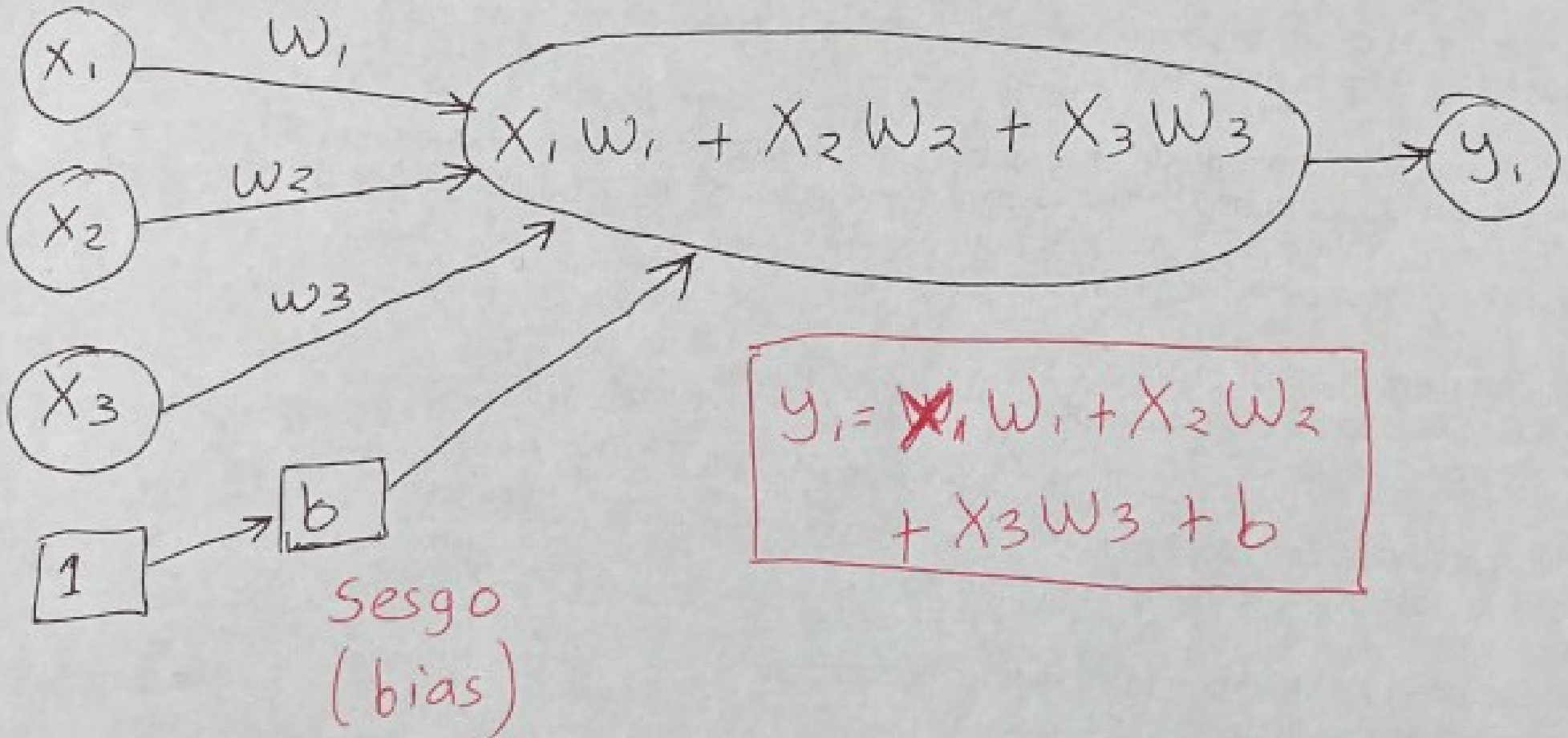
# COMPONENTES



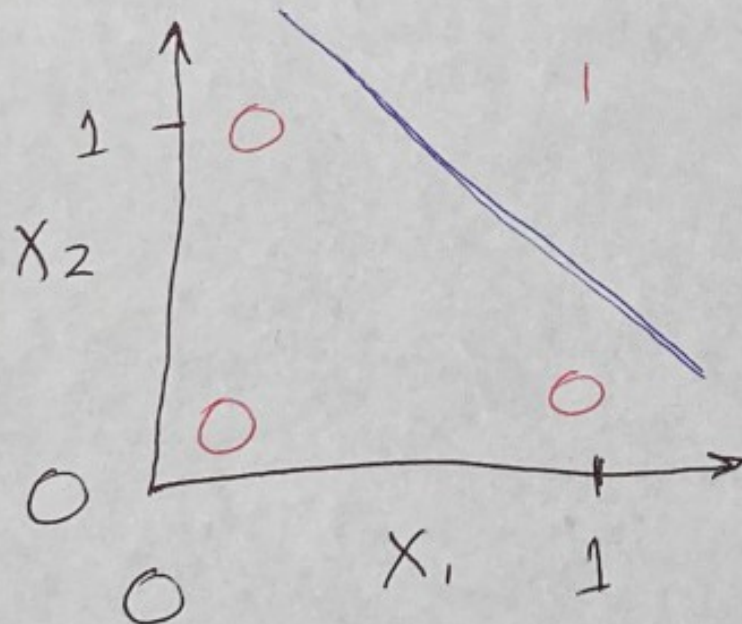
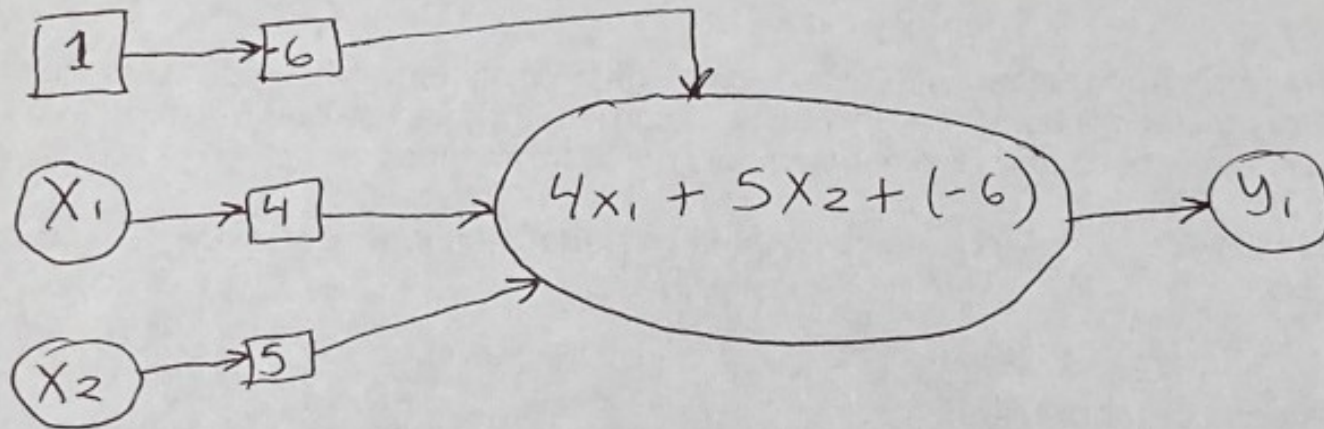
Entradas

Salida

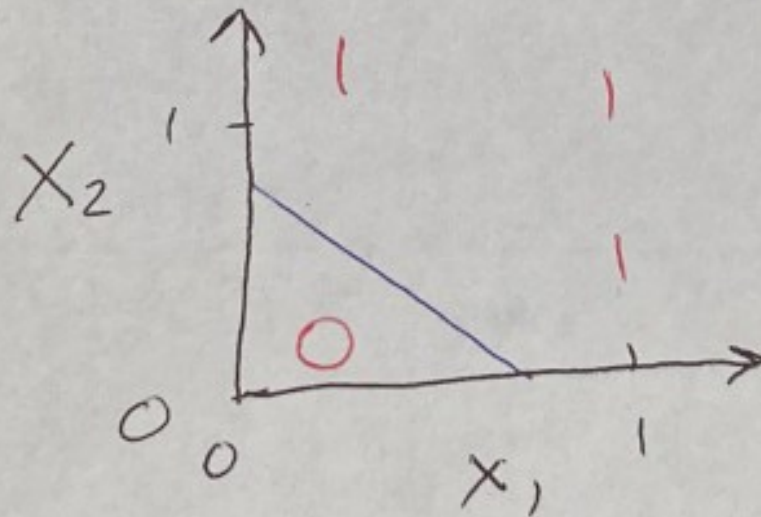
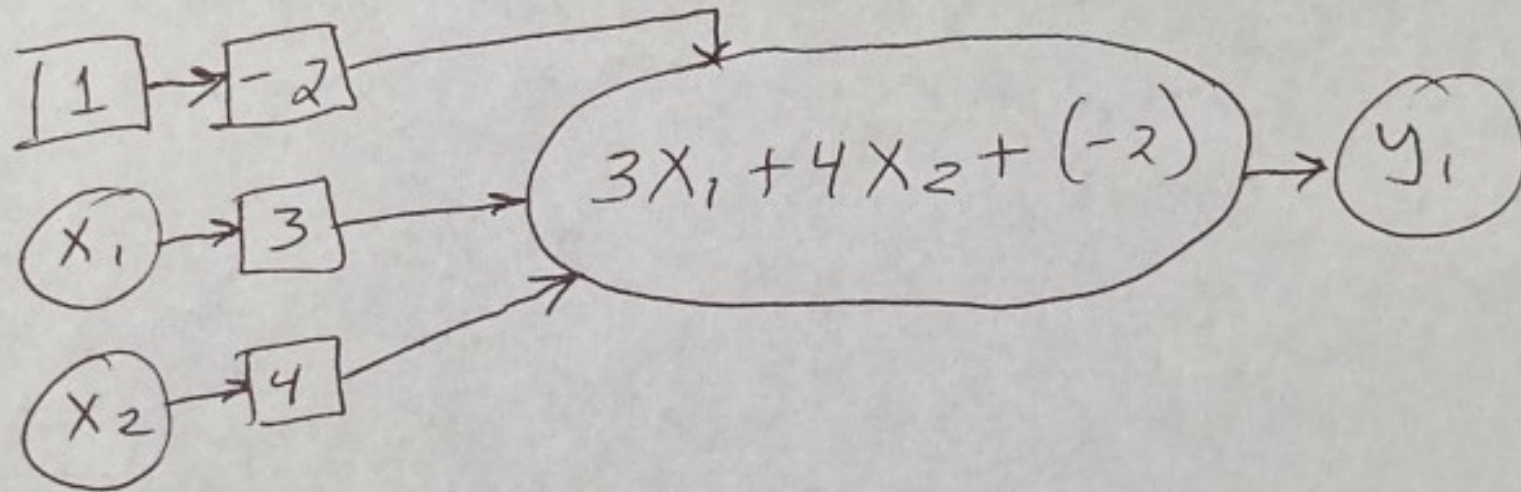
# SUMA PONDERADA



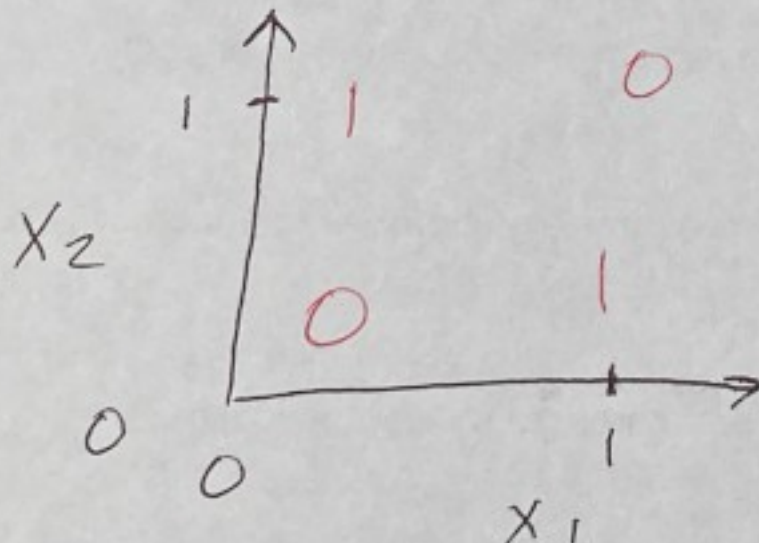
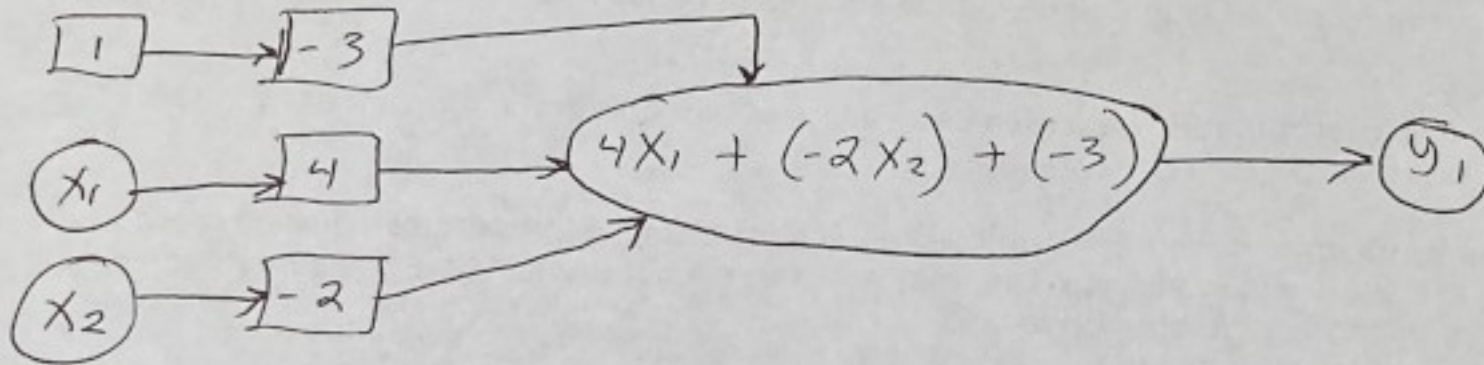
# APRENDIZAJE DE UNA COMPUERTA "AND"



# APRENDIZAJE DE UNA COMPUERTA "OR"

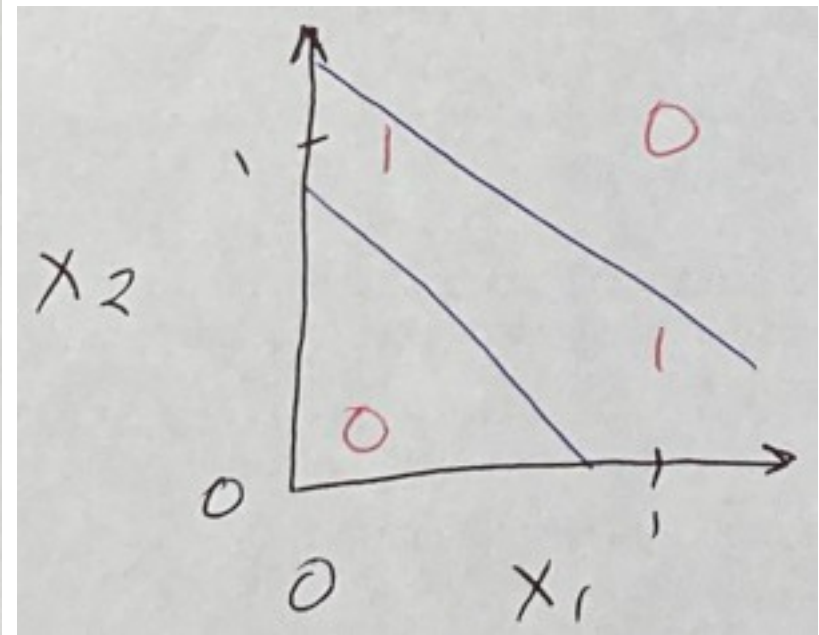
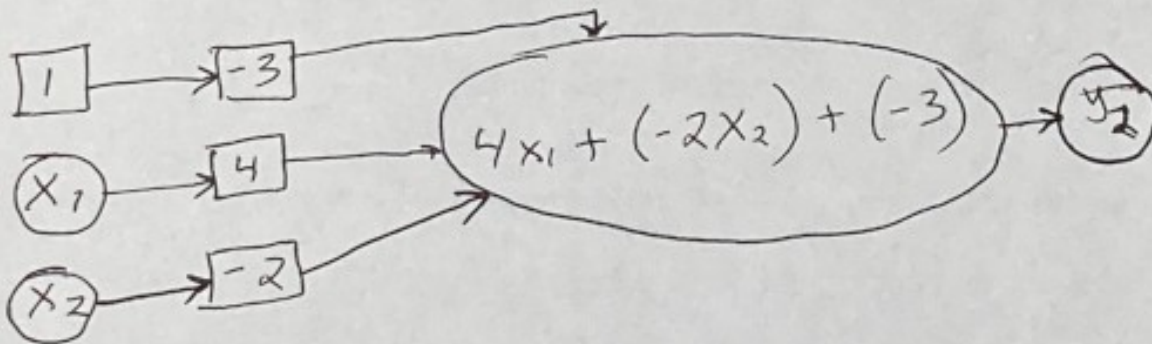
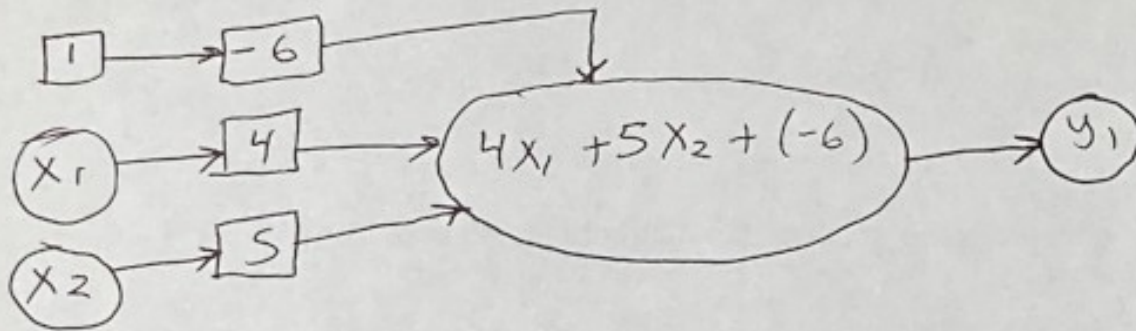


# APRENDIZAJE DE UNA COMPUERTA "XOR"



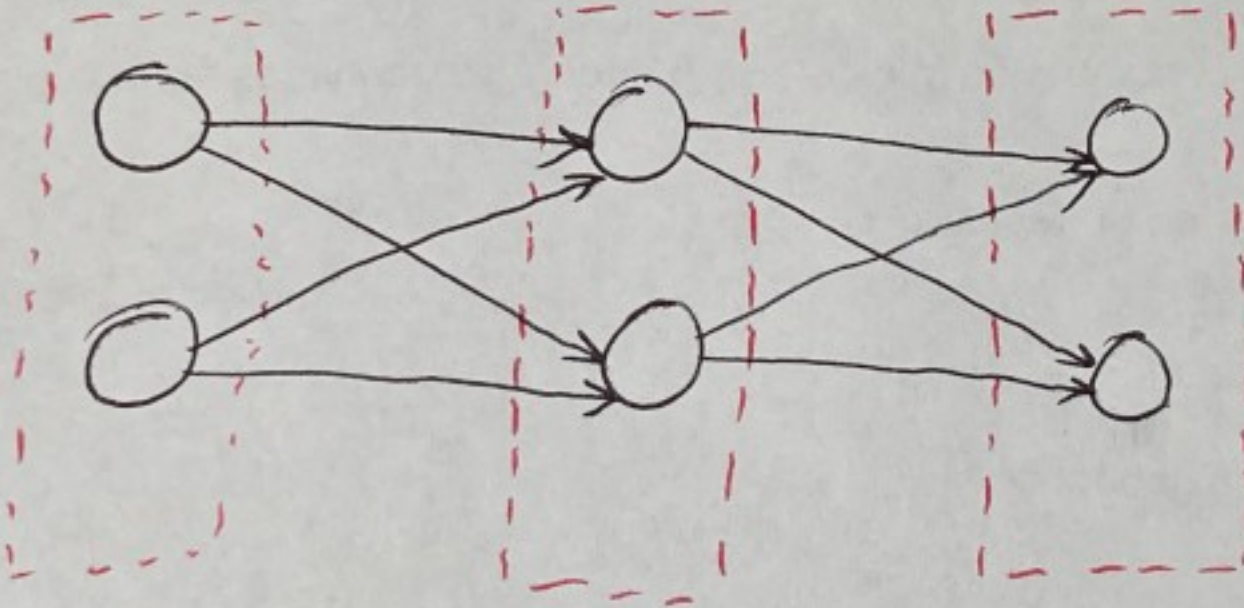
No hay "solución"  
no hay una línea  
que separe esto  
en 2 partes

# SOLUCION DE UNA COMPUERTA "XOR"





# ORGANIZACIÓN DE NEURONAS



Capa de  
Entrada

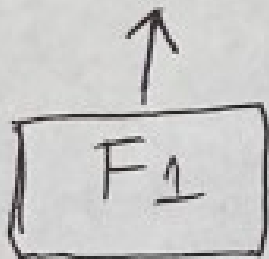
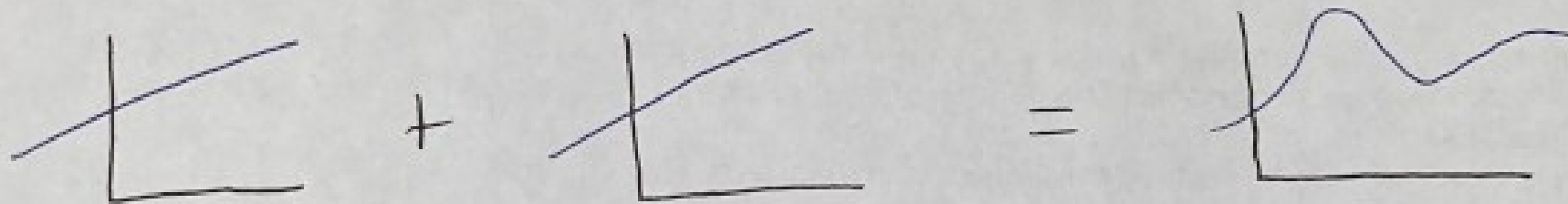
Capas  
Ocultas

Capa  
de Salida

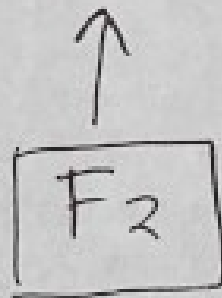
# SUMA DE REGRESIONES LINEALES



# FUNCION DE ACTIVACION



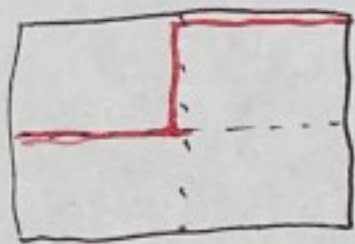
Escalonada



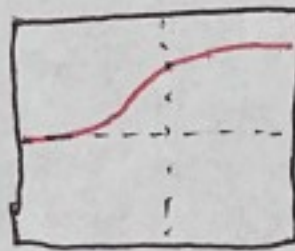
Sigmoide

Respuesta  
NO LINEAL

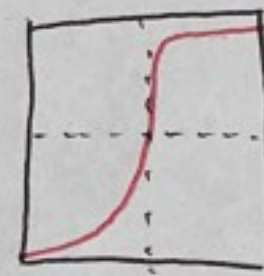
# FUNCIONES DE ACTIVACION



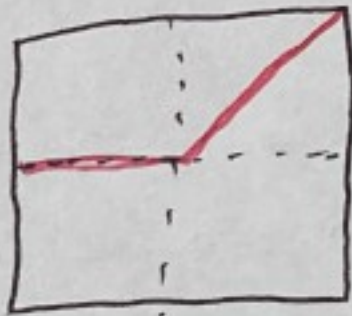
Escalonada



Sigmoide



Tangencial



RELU



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