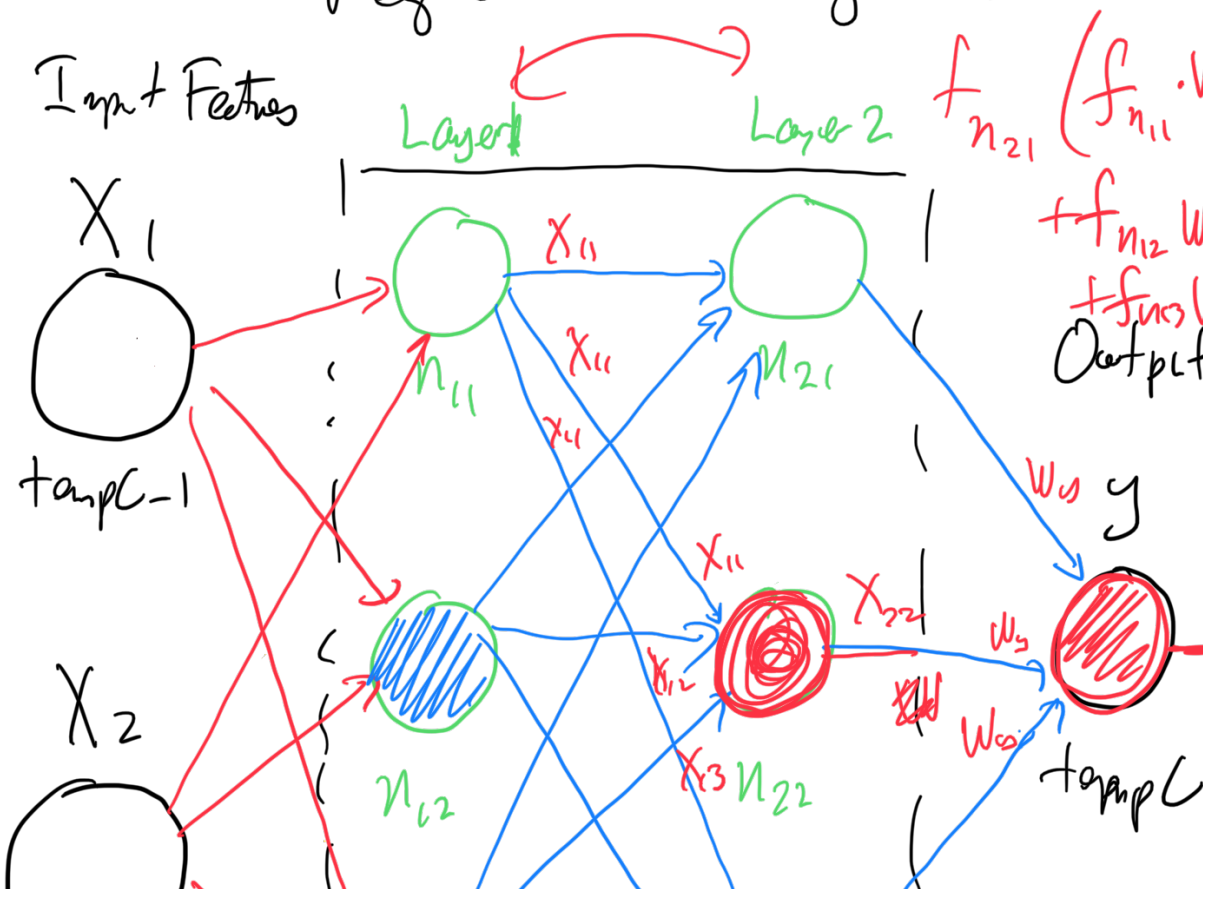
Physics 421 / PCSE 503
Lecture 15

Neural Networks

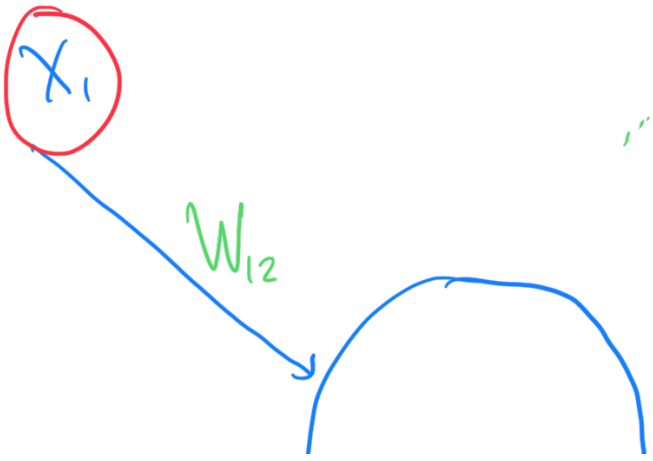
→ a way to introduce non-linearity into the regression analysis!



$\beta_0, \beta_1, \beta_2$

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2$$

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 x_2 + \beta_1^{(2)} x_1^2 + \beta_2^{(2)} x_2^2 + \cdots$$



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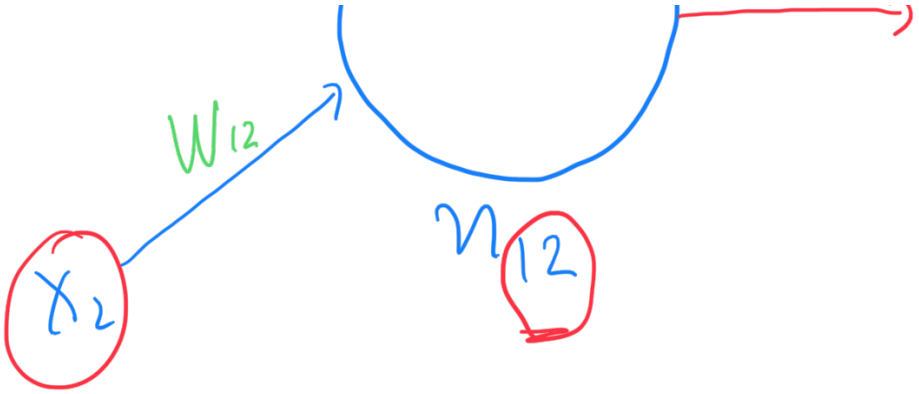
x_{12}



$$X_{12} = f_{n_{12}}\left(W_{12}X_1 + W_{12}X_2\right)$$

Guess!

W_{11} $f_{n_{11}}$

W_{12}

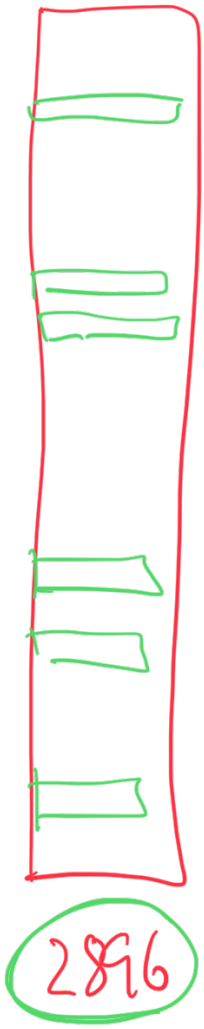
W_{13} $f_{n_{12}}$

$f_{n_{13}}$

Traing → 2019

Test → 2018

Validation → 201+



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LOSS
↓
χ^2

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1. $A \to B$: As

1. A : As

2 B : E1

$$\sim(A \wedge B) \iff \sim A \vee \sim B$$

1.	$\sim(A \wedge B)$	:	AS
2.	A	:	AS
3	$\bot$	:	$\sim$E 1,2