

PROB 140

Fall 2021

WEEK 14 STUDY GUIDE



Probability for Data Science

The Big Picture

Simple linear regression predicts Y as a linear function of a single X . No matter what the joint distribution of X and Y , there is always a least squares line. If X and Y are bivariate normal, this line turns out to be the best among all

predictors.

- A straightforward least-squares calculation results in the Data 8 formula for the equation of the regression line.
- Standard bivariate normal X and Y can be constructed so that Y is the sum of a linear function of X and independent normal noise.
- For the bivariate normal, the conditional expectation is a linear function of the given variable, and hence is the same as the best linear predictor.

Week At a Glance

Mon 11/22	Tue 11/23	Wed 11/24	Thu 11/25	Fri 11/26
	Instructor's Session	Thanksgiving Holiday		
HW 13 Party 12-2PM	HW 13 Due			
	Lab 8 Due			
Skim Sections 24.1 to 24.2	Read Section 24.1 and 24.2			

Reading, Practice, and Live Sessions

Sections	Topic	Live Sessions: Prof. Sahai	Live Sessions: GSIs	Recommended Practice
Ch 24	<p>Simple Regression</p> <ul style="list-style-type: none"> - 24.1 derives the equation of the regression line - 24.2 constructs bivariate normal random variables so that the relation between can be expressed in terms of “linear signal plus noise” - 24.3 looks at least-squares prediction in the context of the bivariate normal, and the connection with linear regression - 23.4 writes the regression equation in multiple different ways, each one illuminating a different property 	<p>Tuesday 11/16</p> <ul style="list-style-type: none"> - Simple regression: general case - Bivariate normal - Regression and the bivariate normal 		<p>Take a break from exercises, but read Ch 24 carefully.</p>