

MSE-213

Probability and statistics for materials science

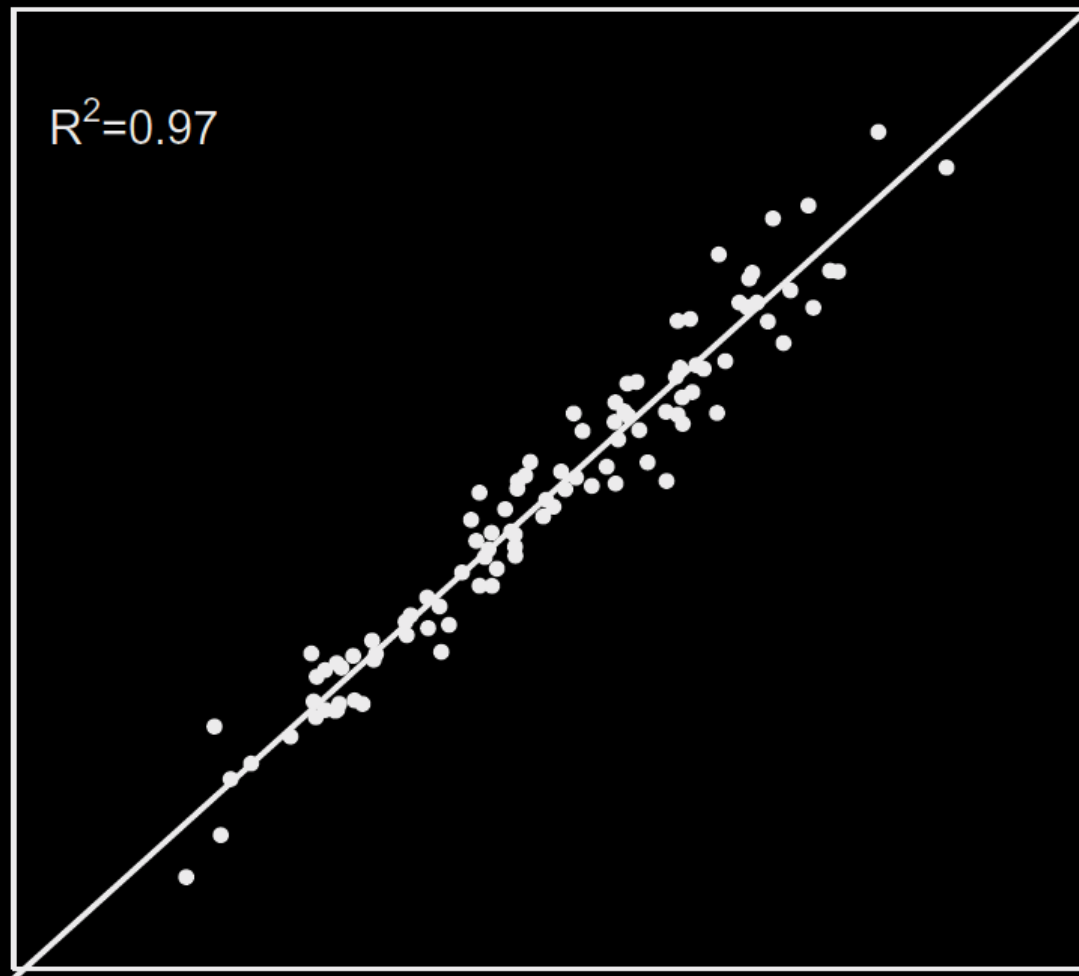
Lecture 11

ANOVA / F-test for linear regression with one slope

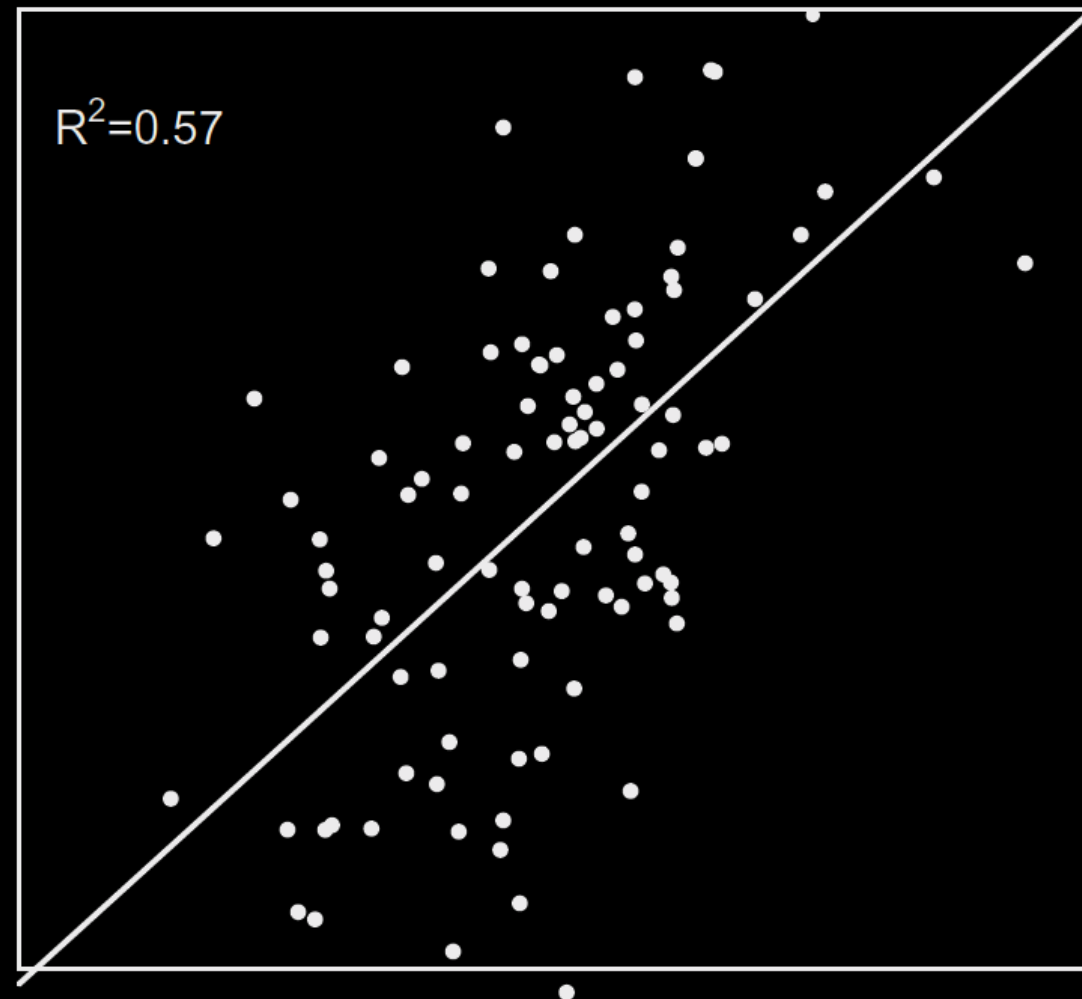
Source of Variation	Degrees of Freedom, ν	Sum of Squares, SS	Mean square, MS	Fisher statistic, F_{MEASURED}
Model (with 1 slope)	1	SS_M	$SS_M/1$	MS_M/MS_E
Error within Residuals	$N_{ST}-2$	SS_E	$SS_E/(N_{ST}-2)$	
Total	$N_{ST}-1$	SS_T		

SS_M sometimes called SS_R for “REGRESSION”

Linear Regression – The R^2 “goodness of fit”

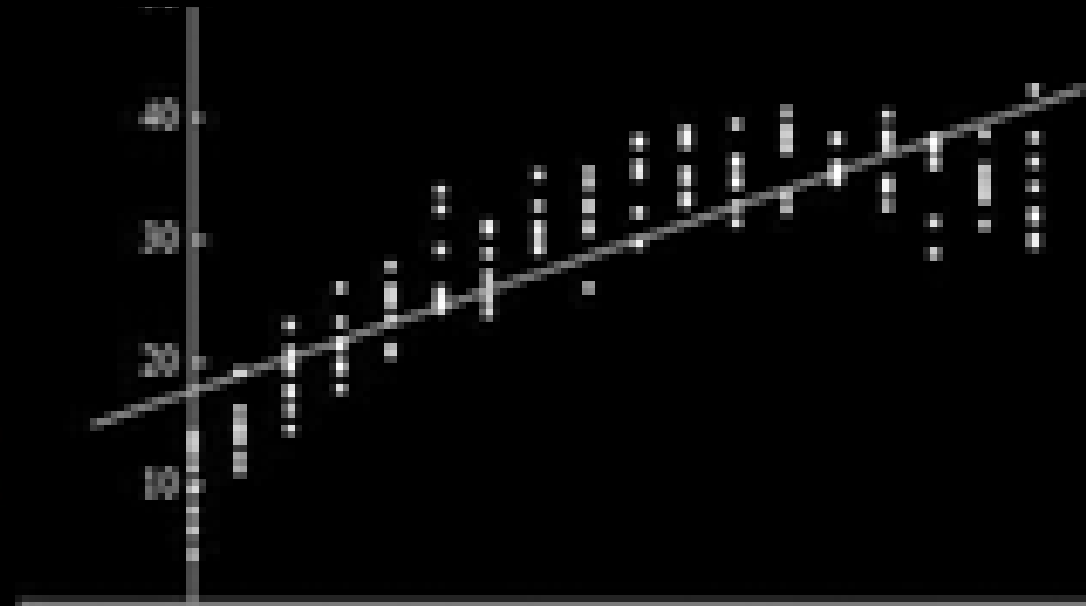
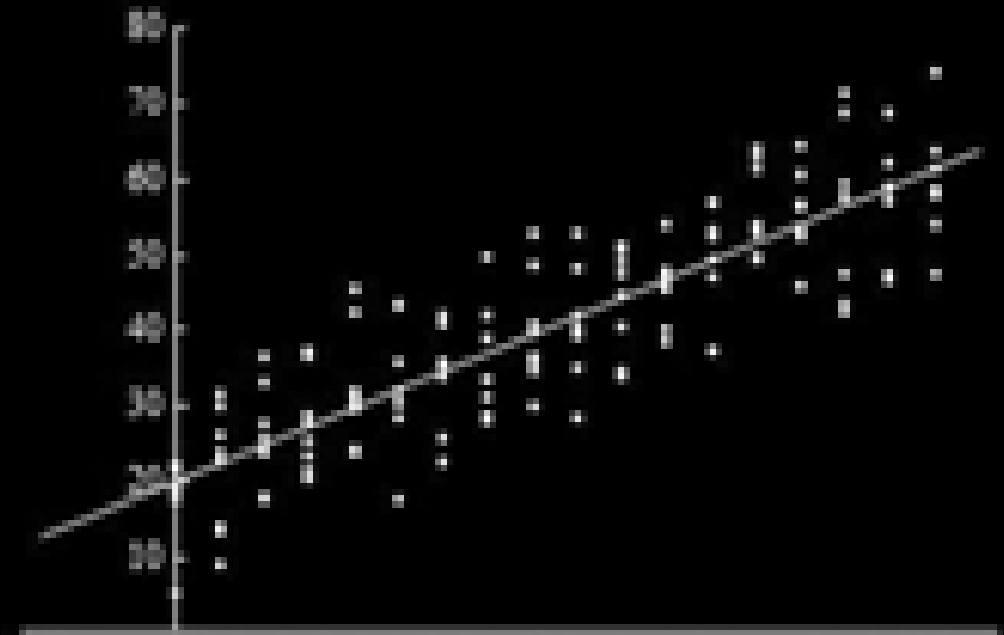
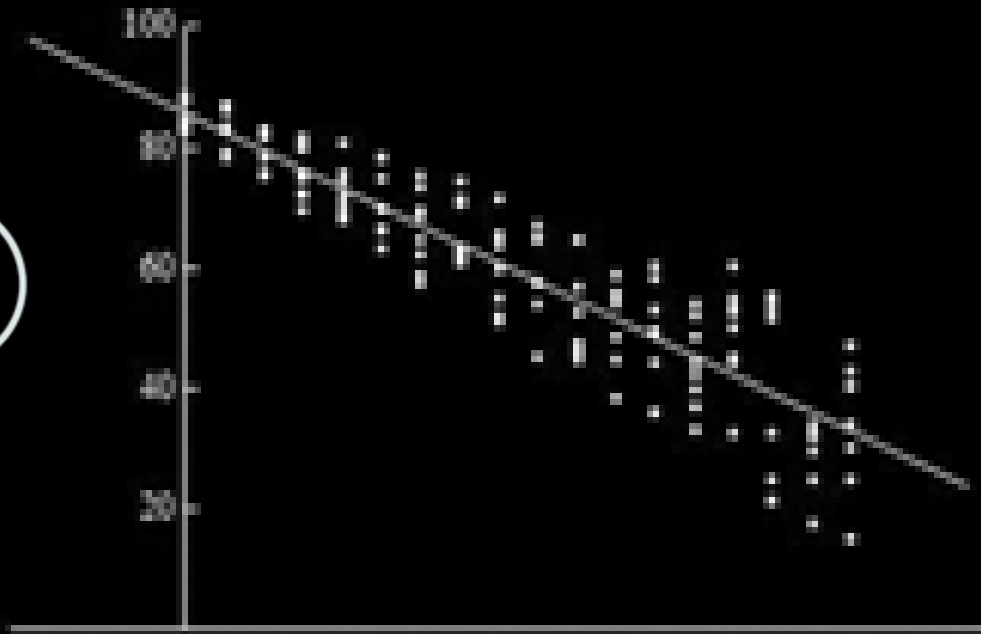


(a) Strong linear relationship

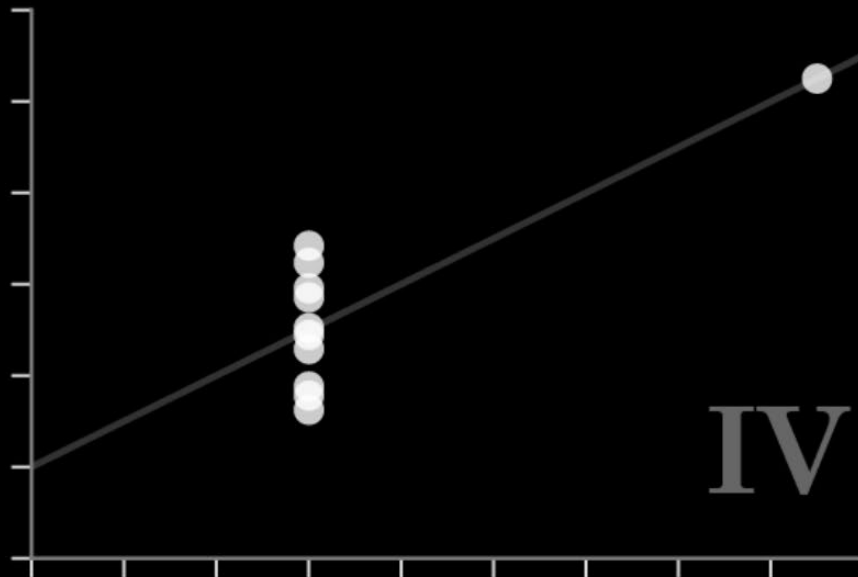
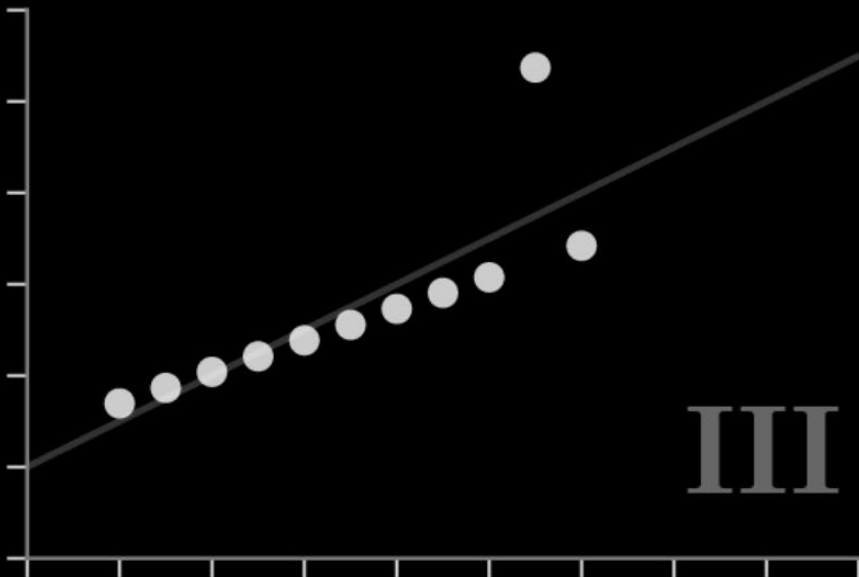
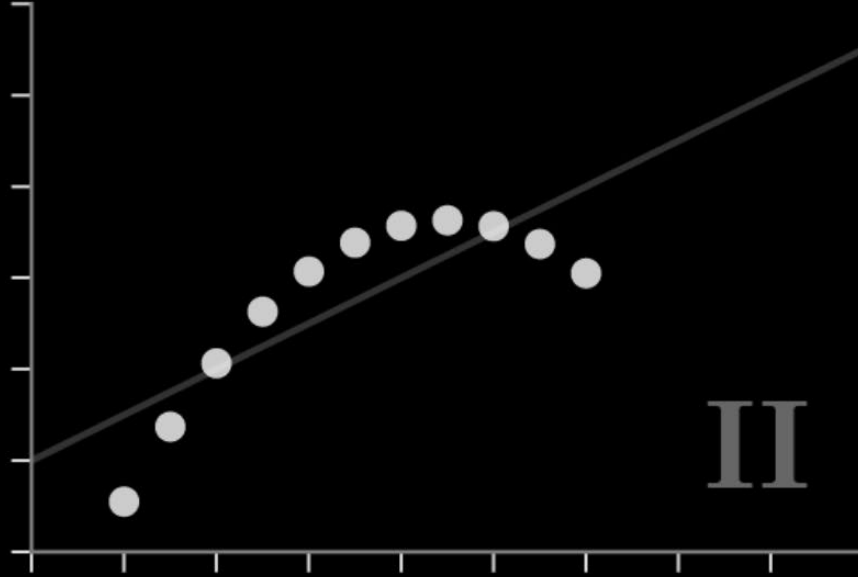
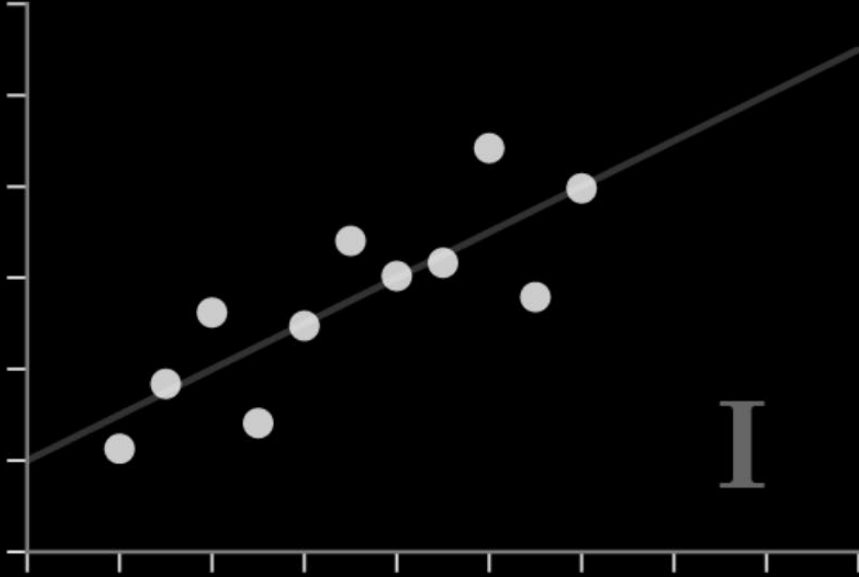


(b) Weak linear relationship

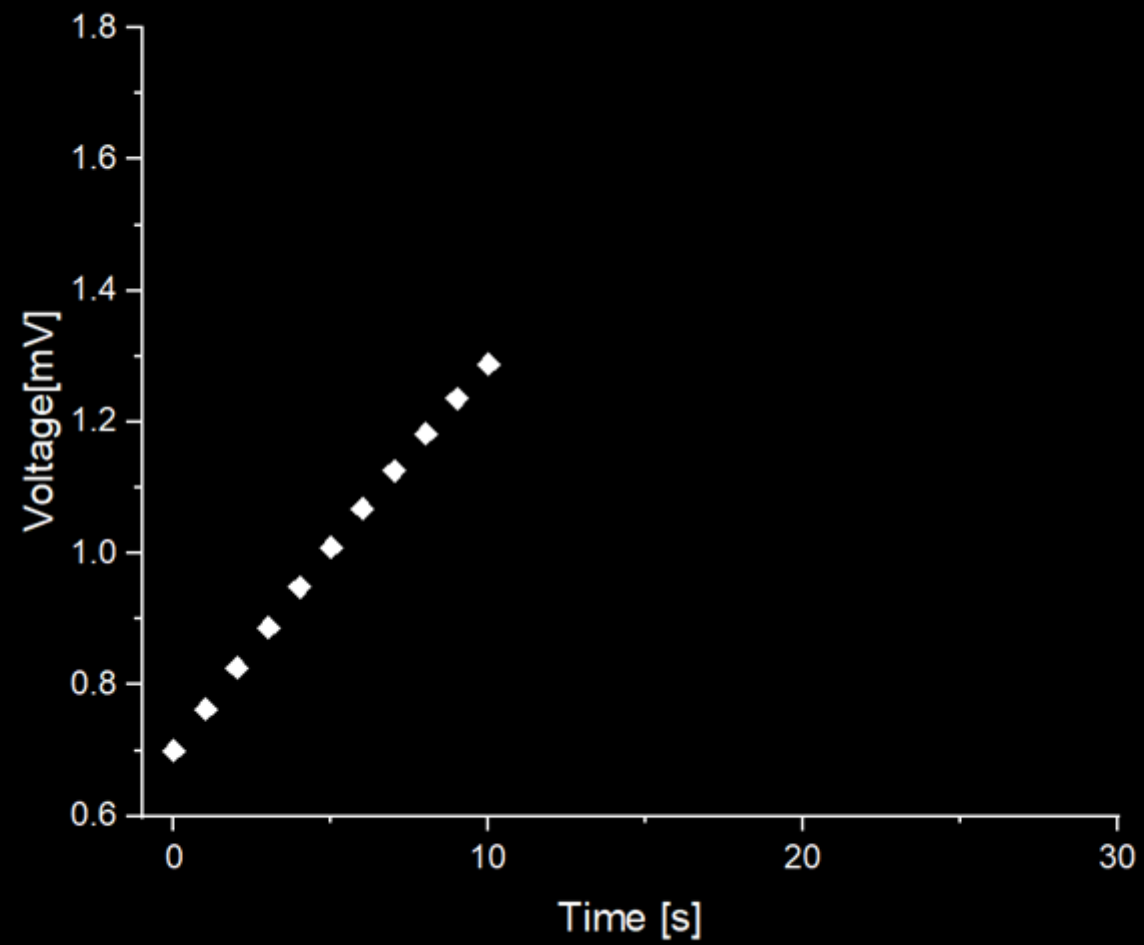
Which data fulfil the criteria?

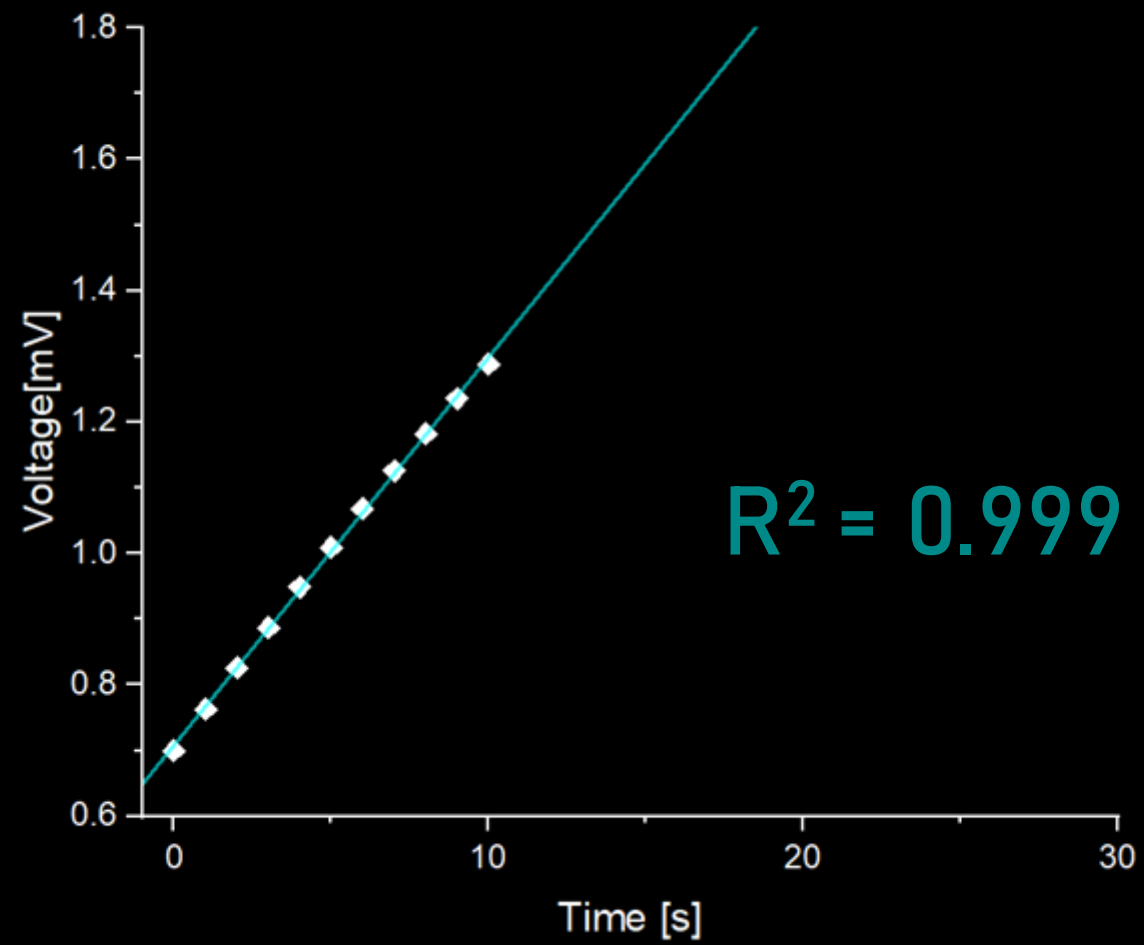


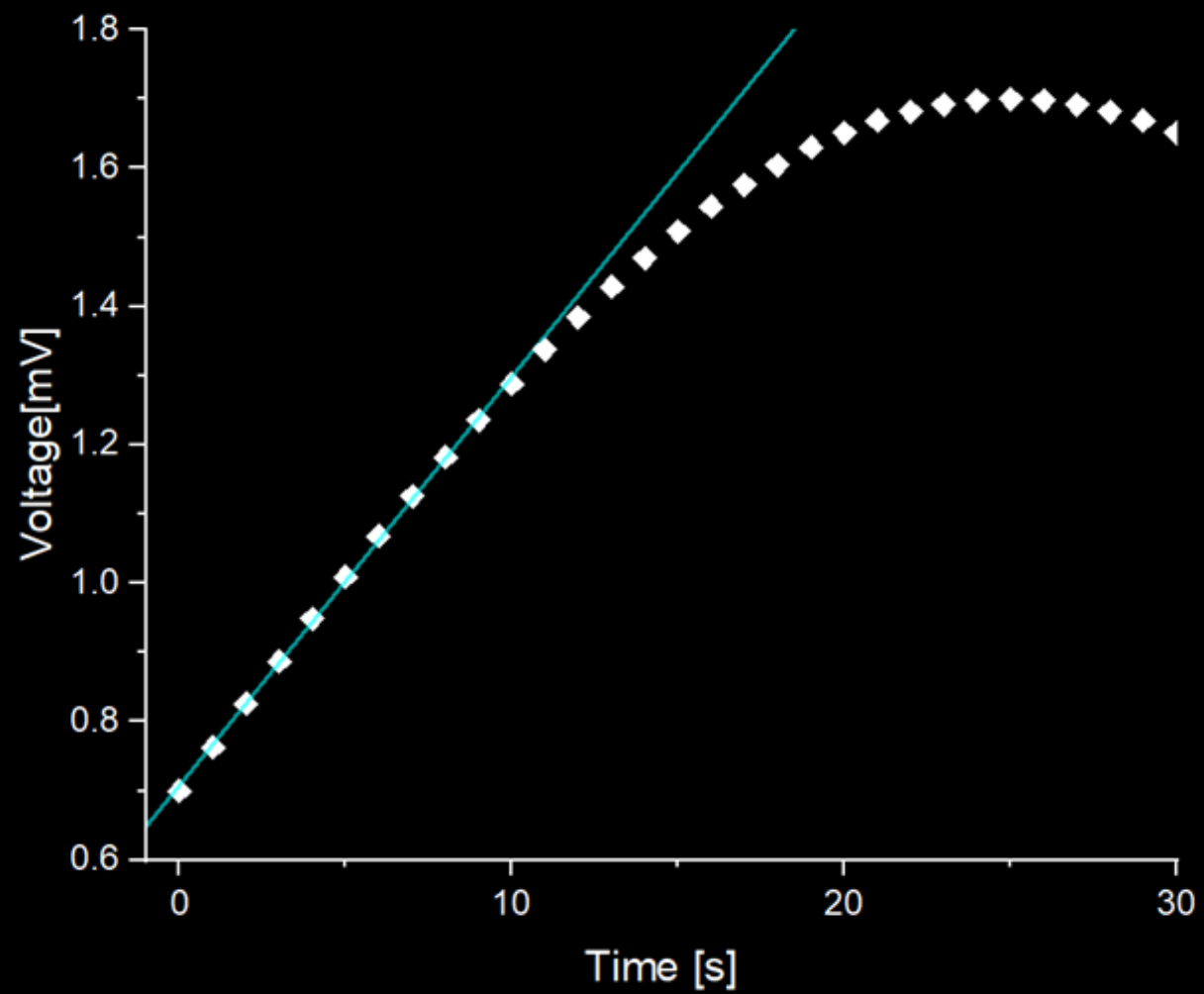
All R^2 are 0.82 here



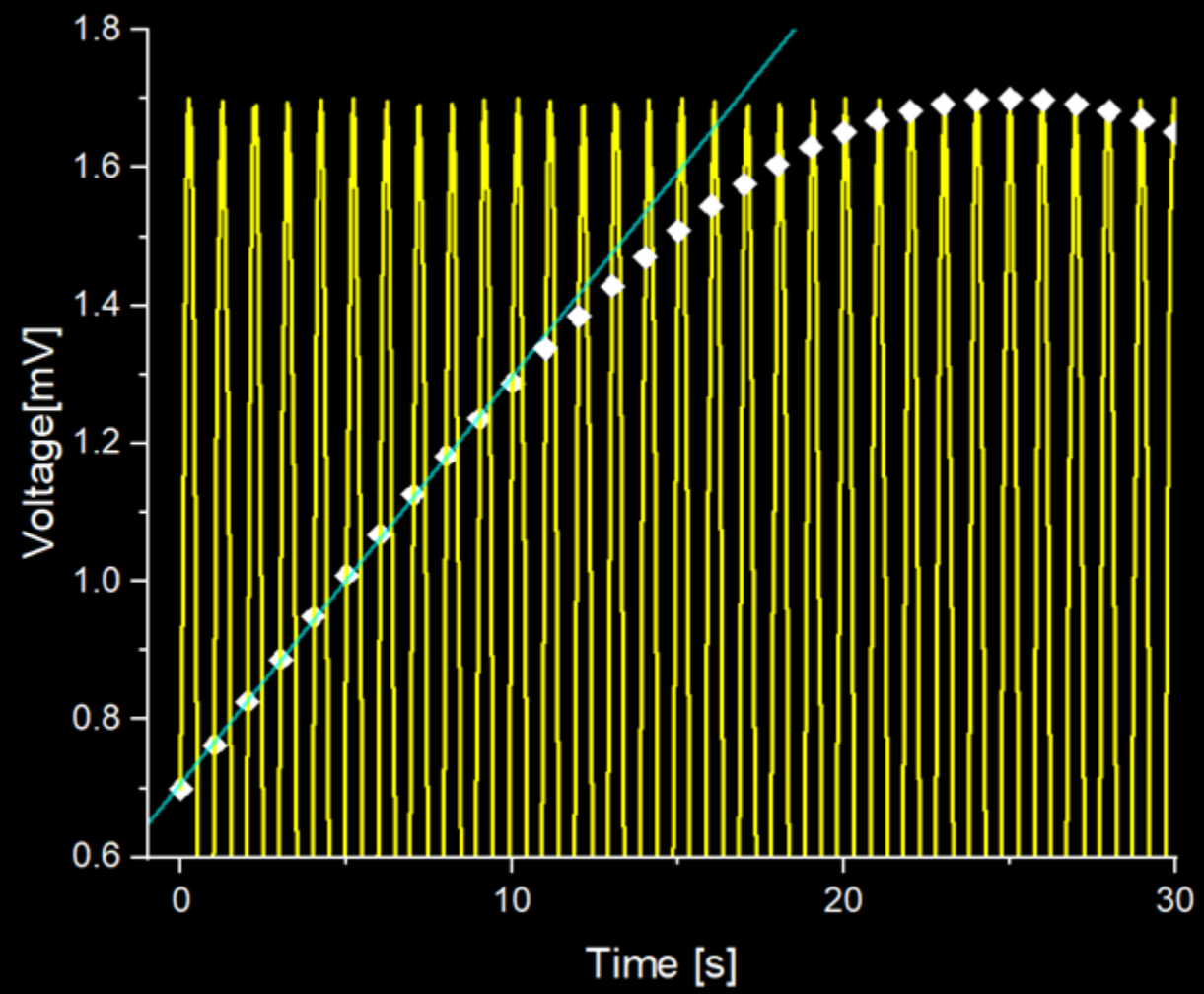
Fitting data. A cautionary tale. Part I







Only trust your fit...



Fitting data. A cautionary tale. Part II

Fluorescence (a.u.)

2,600 2,800 3,000 3,200
Microwave frequency (MHz)



