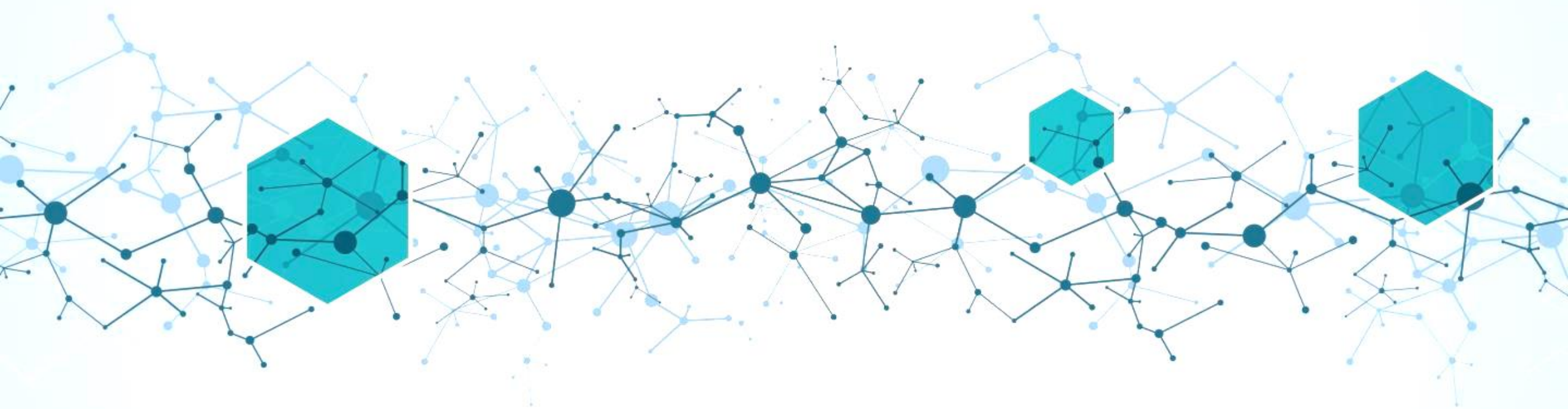


Lecture 02:

-

Introduction to Key Assumptions for Linear Regression

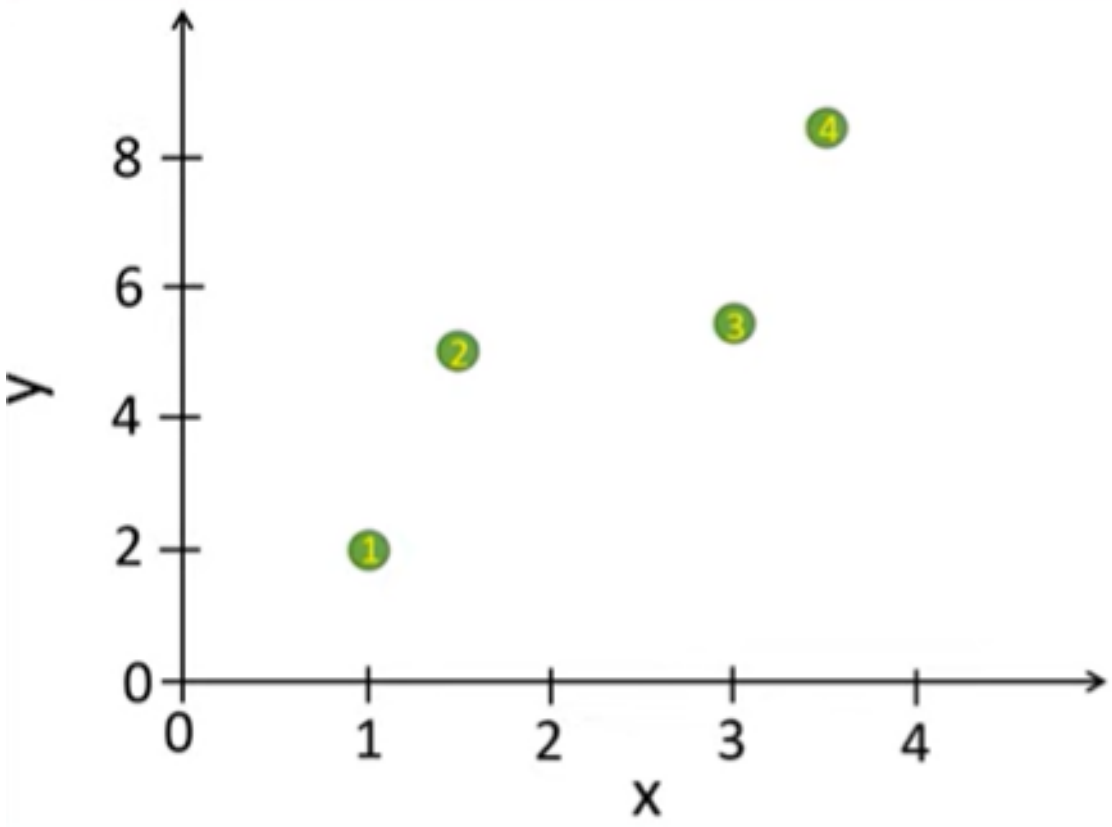
DTSC 2301

January 18th, 2024

University of North Carolina at Charlotte

Linear Regression...

X	Y
1.0	2.0
1.5	5.0
3.0	5.5
3.5	8.5

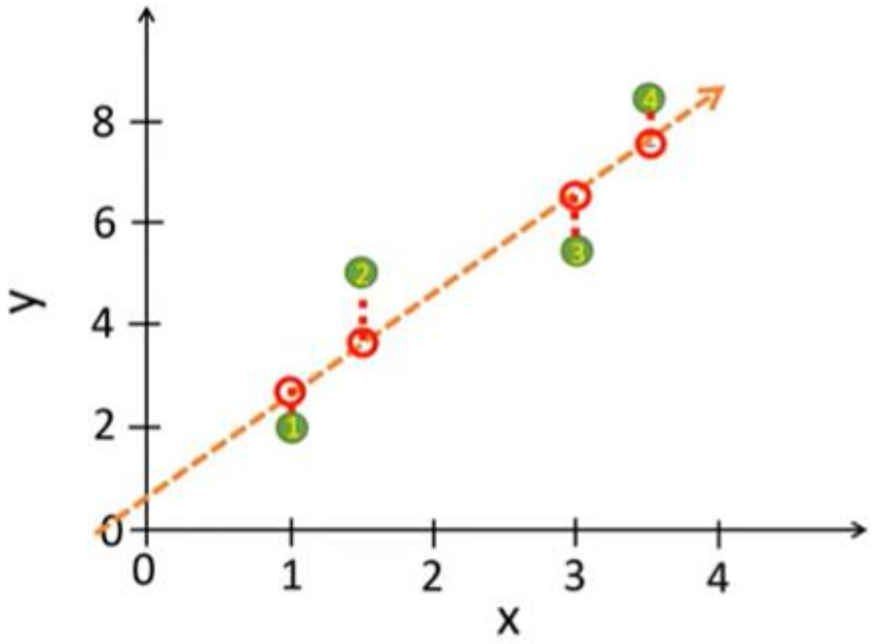


Residuals

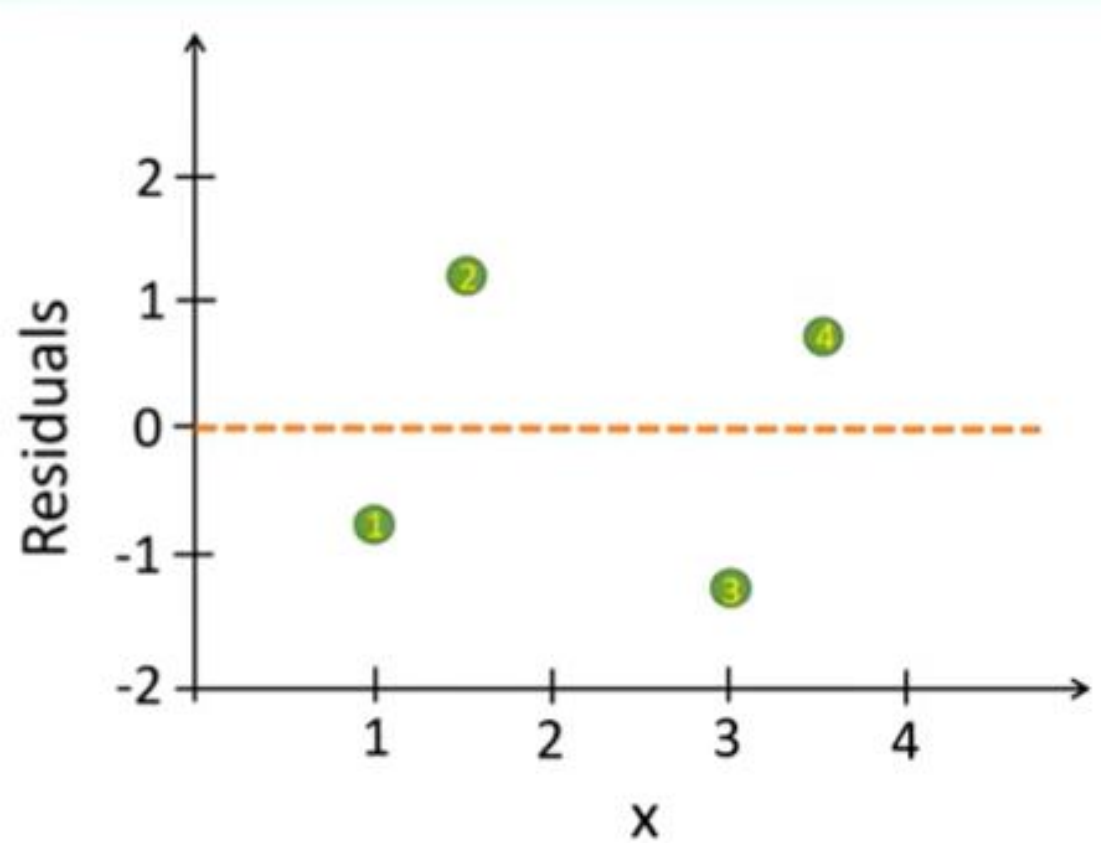
$$Residual = observed\ value\ - estimated\ value$$

$$y = 0.75 + 2x$$

X	Y	Yest
1.0	2.0	2.75
1.5	5.0	3.75
3.0	5.5	6.75
3.5	8.5	7.75

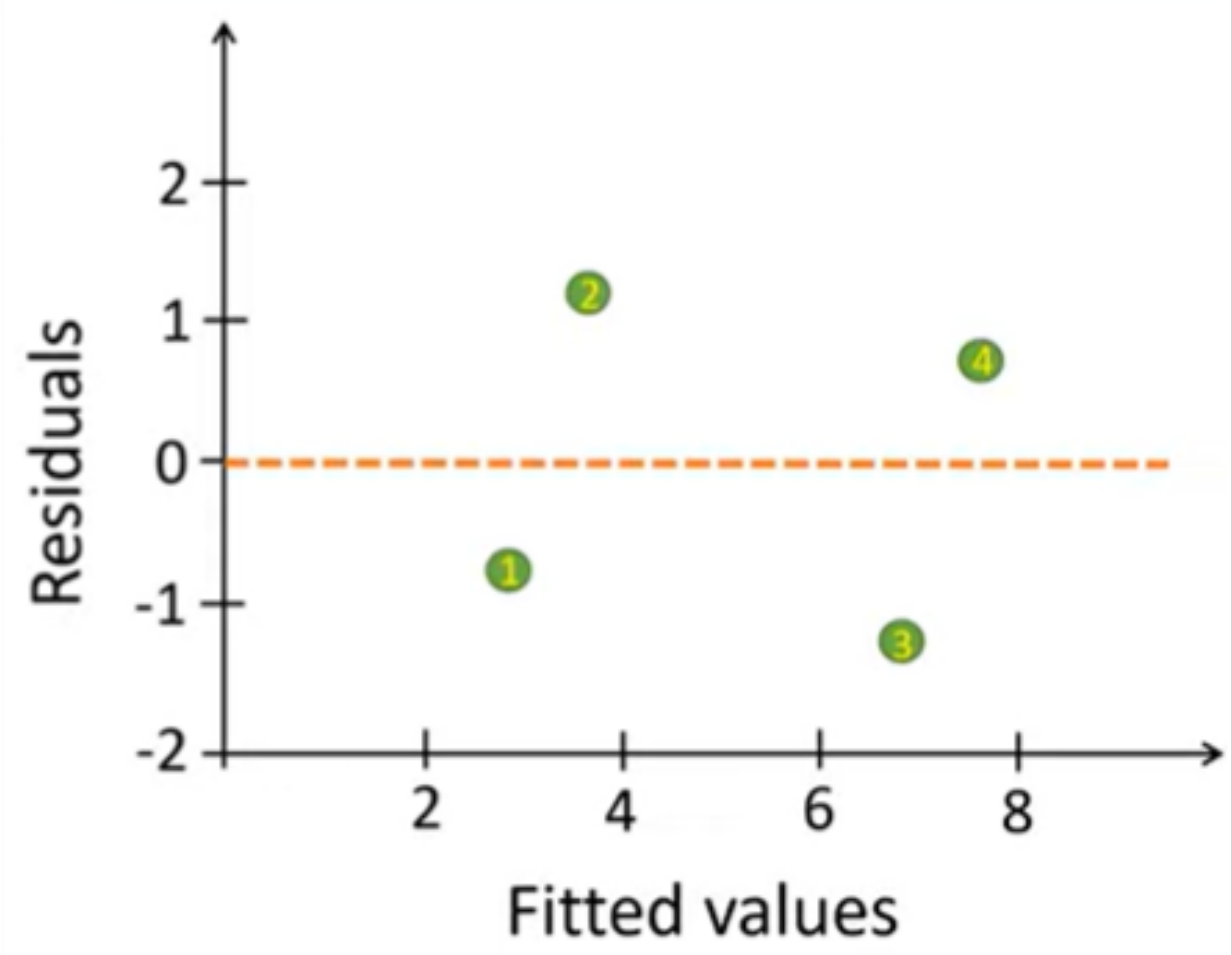


Residual Plot (residuals vs X)

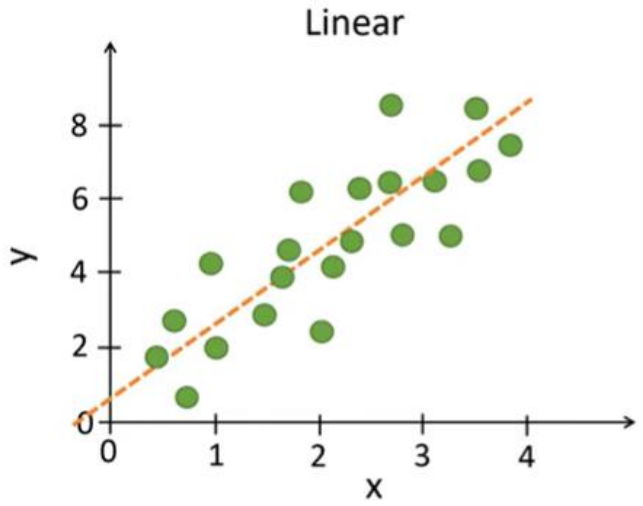


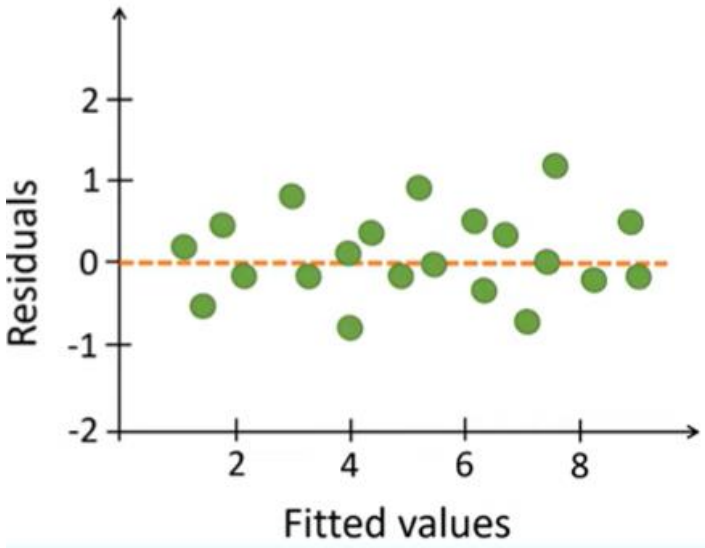
X	Y	Yest	Y-Yest
1.0	2.0	2.75	-0.75
1.5	5.0	3.75	1.25
3.0	5.5	6.75	-1.25
3.5	8.5	7.75	0.75

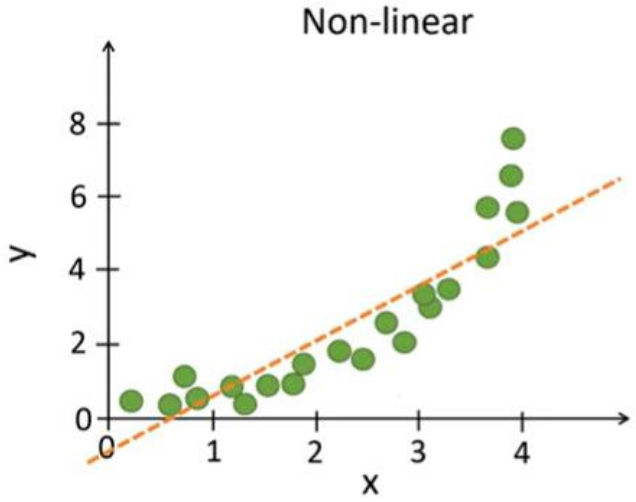
Residual Plot (residuals vs fitted values Yhat)

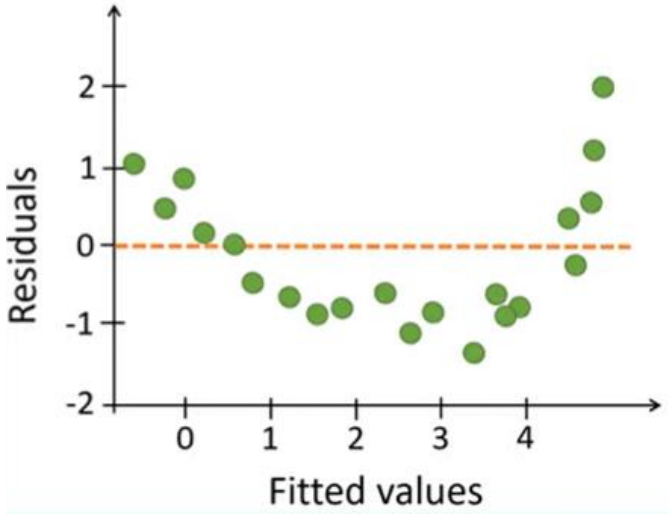


Correct Model Specification

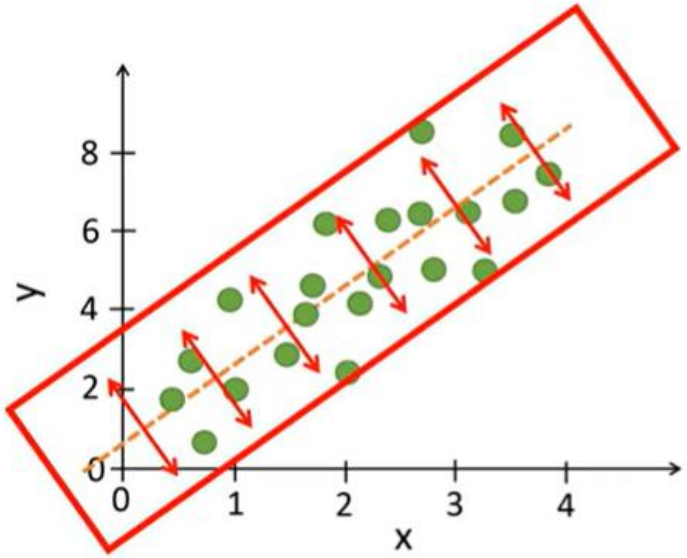


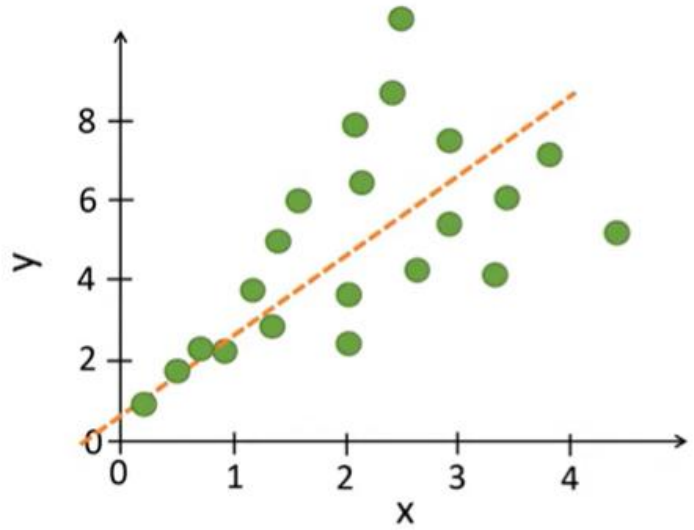


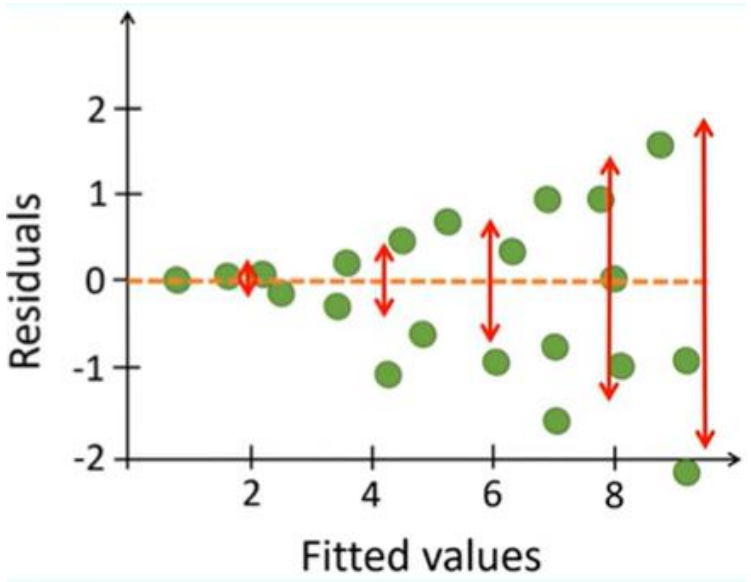


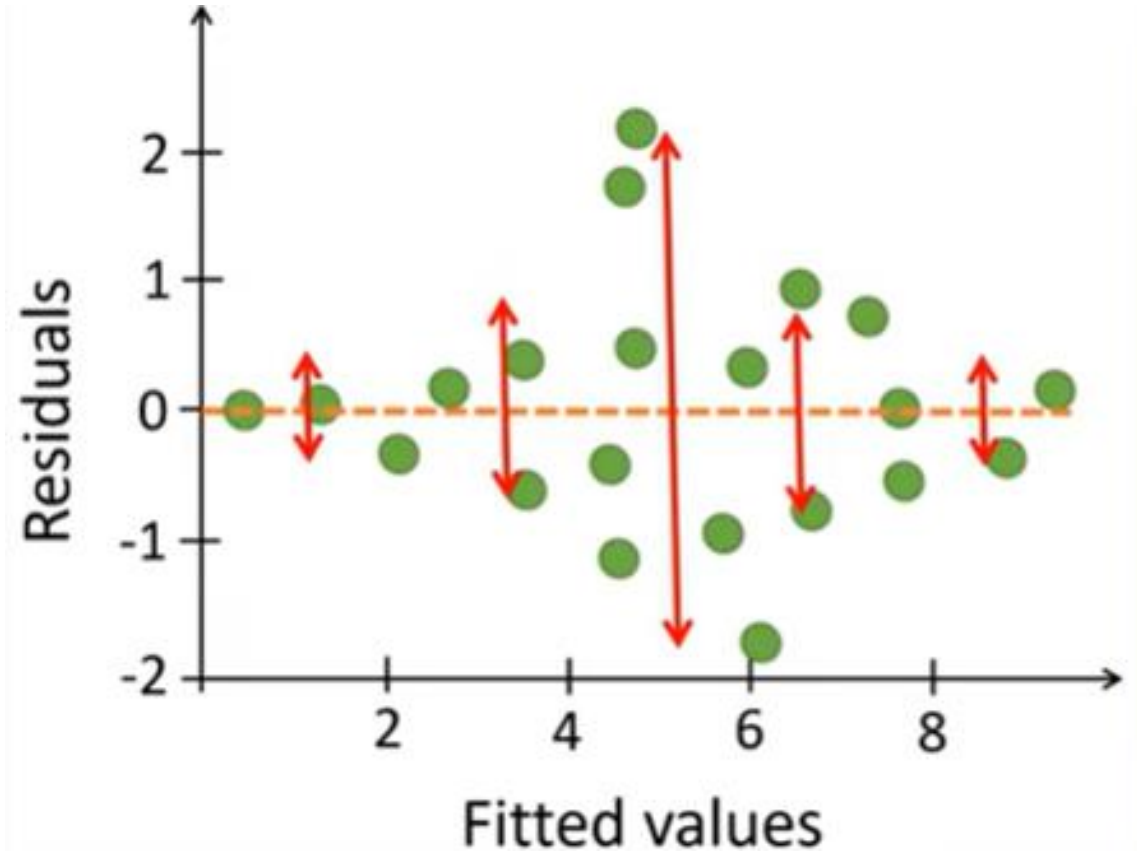


Equal Variance (homoscedasticity)

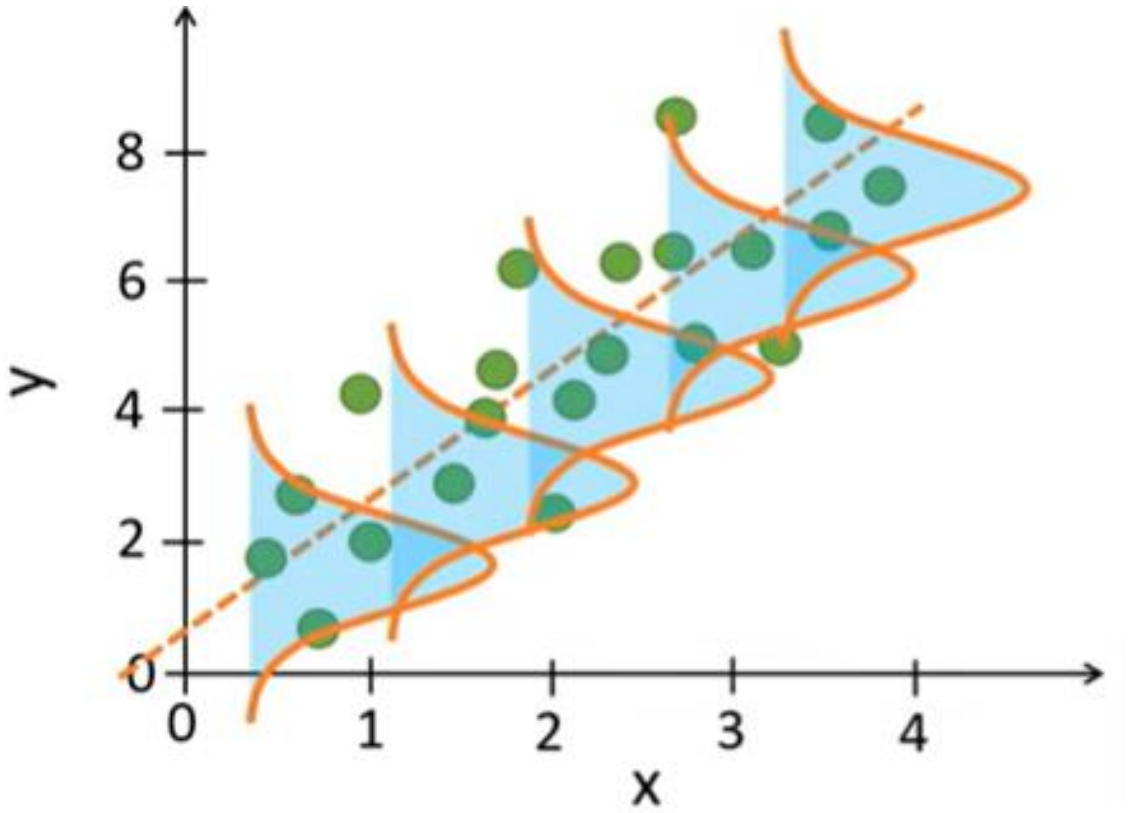


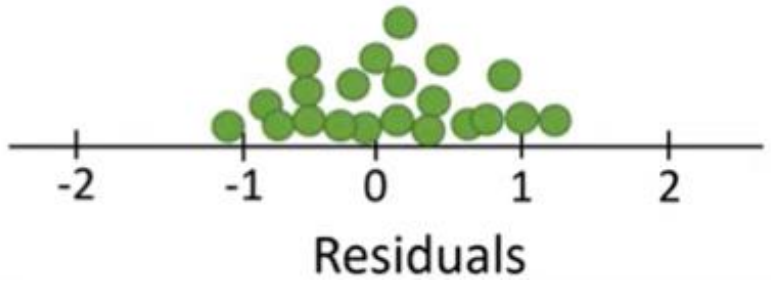


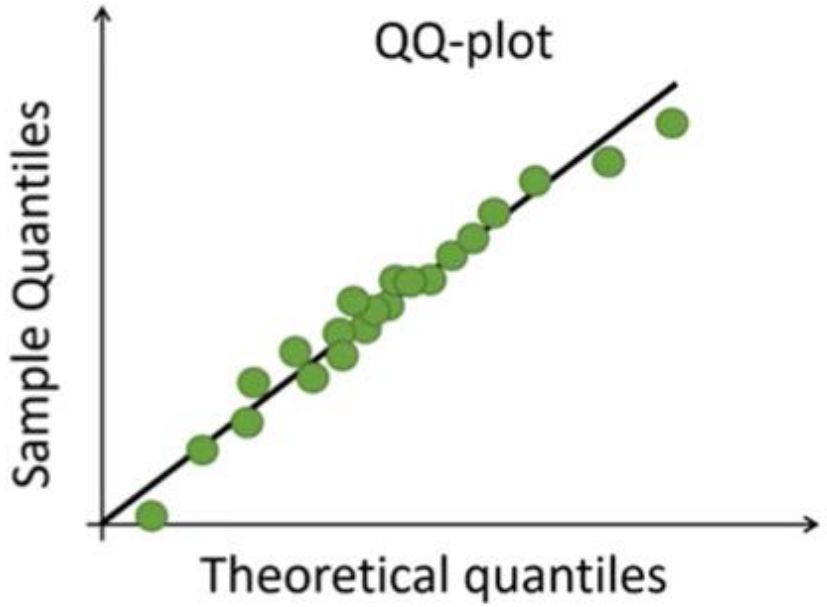



Residuals
2
1
0
-1
-2
2
4
6
8
Fitted values

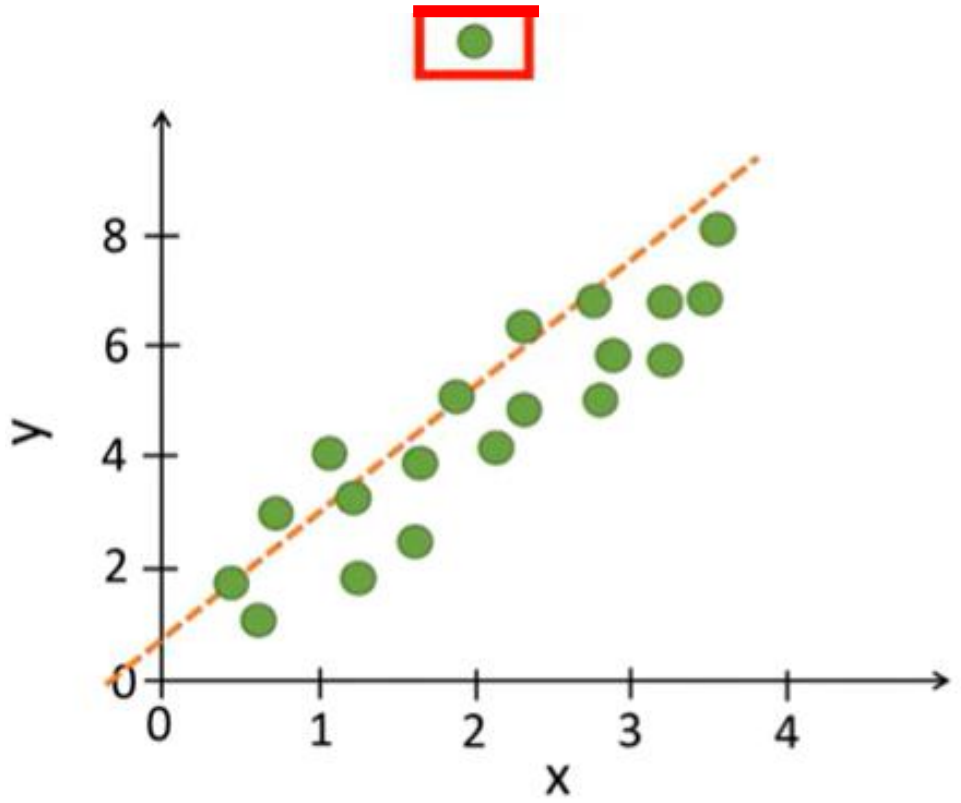
Normality

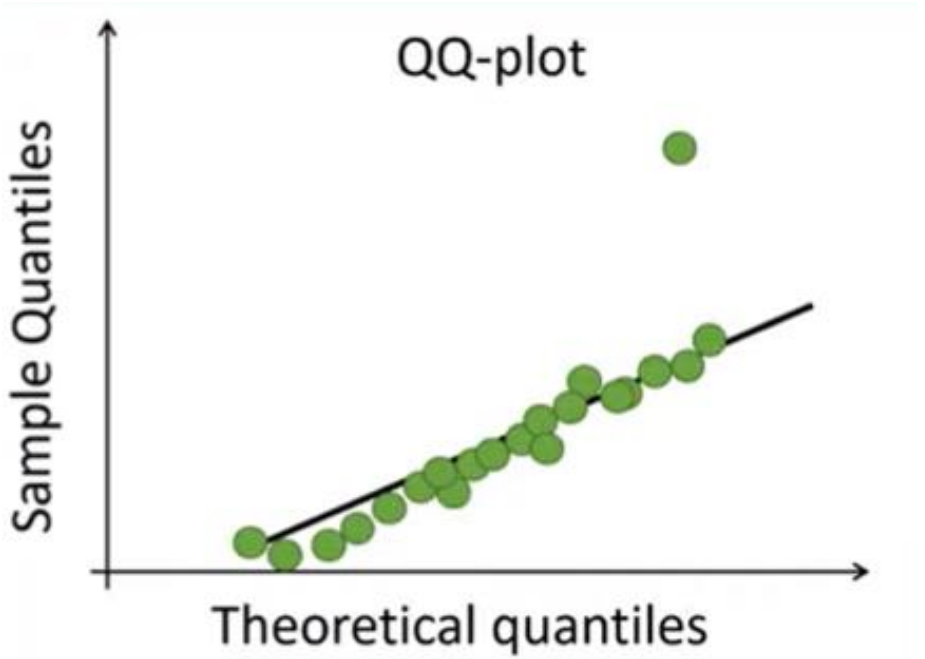

y
x
0
2
4
6
8
0
1
2
3
4


-2
-1
0
1
2
Residuals


QQ-plot
Sample Quantiles
Theoretical quantiles

No Outliers


y
x
0
1
2
3
4
0
2
4
6
8


QQ-plot
Sample Quantiles
Theoretical quantiles

Error Independence