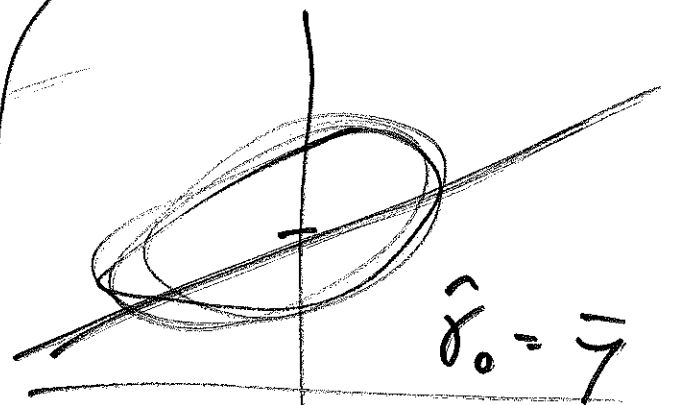
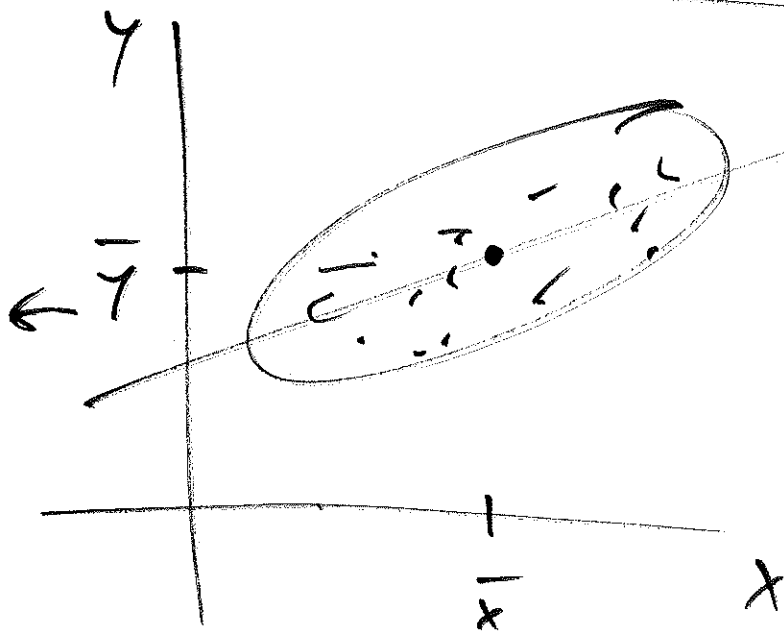


Ans ①
206
12 Mar 19

$$Y_i = \beta_0 + \beta_1 x_i + e_i$$

($i = 1, \dots, n$)

\uparrow IID $N(0, \sigma_e^2)$

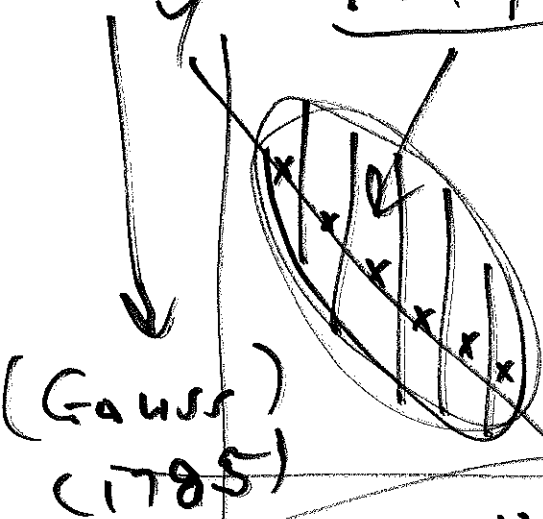


(Legendre)

$$E(Y|X) = \beta_0 + \beta_1 x_i \quad \text{if } (x, y) \sim N_2$$

Galton

$$\frac{1}{n} \sum_{i=1}^n |Y_i - \hat{Y}_i| \quad (\text{MAD})$$



(Gauss)
(1795)

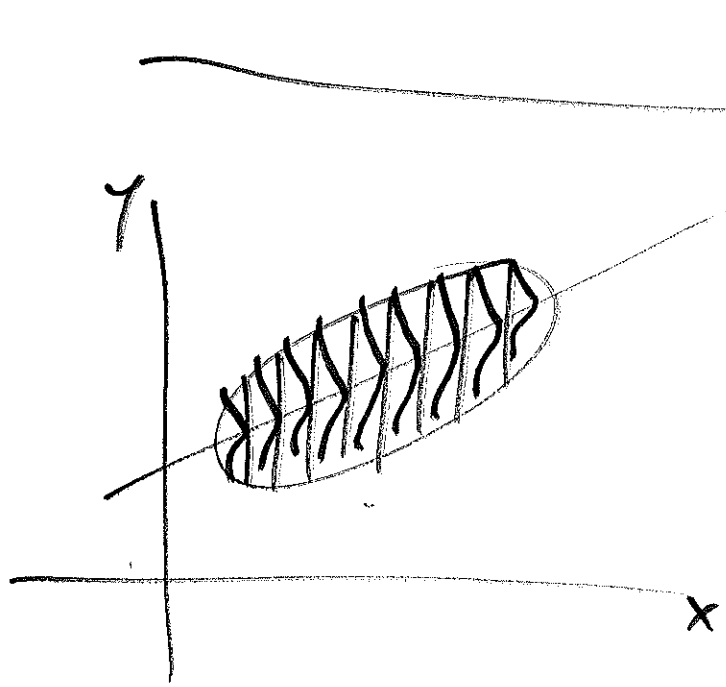
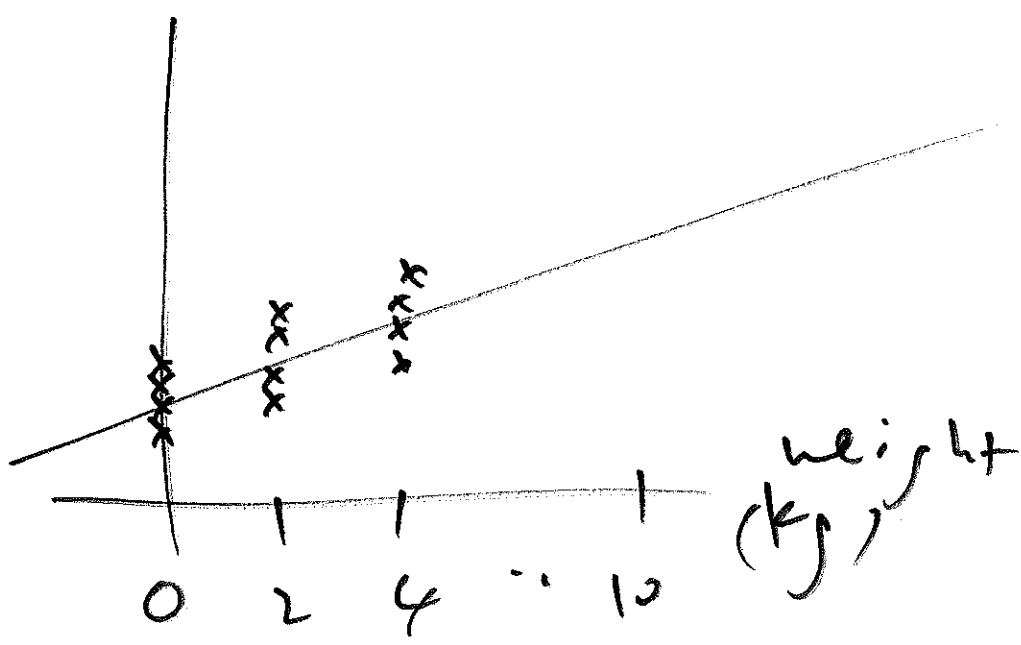
Loss = -Utility

least squares to minimize this

$$\sqrt{\frac{1}{n} \sum_{i=1}^n (Y_i - \hat{Y}_i)^2}$$

= root mean squared error (RMSE)

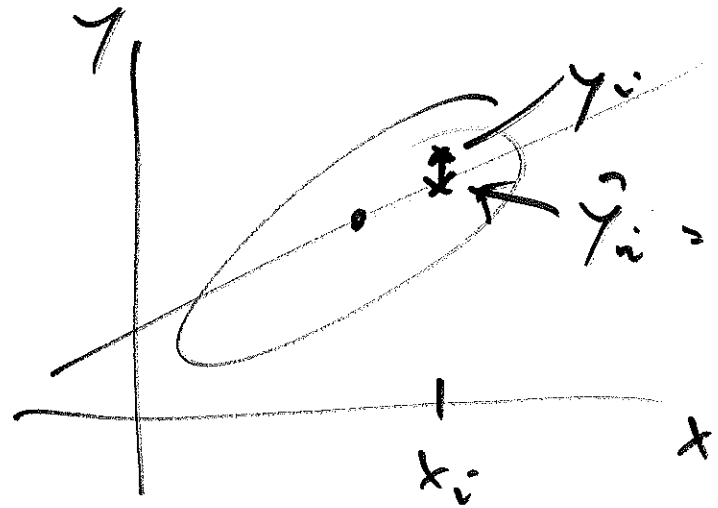
Hooke's Law



$$y_i = \beta_0 + \beta_1 x_i + e_i$$

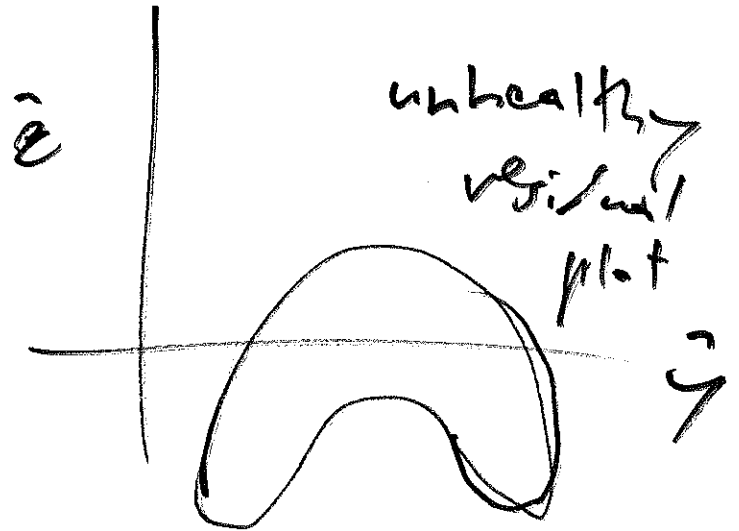
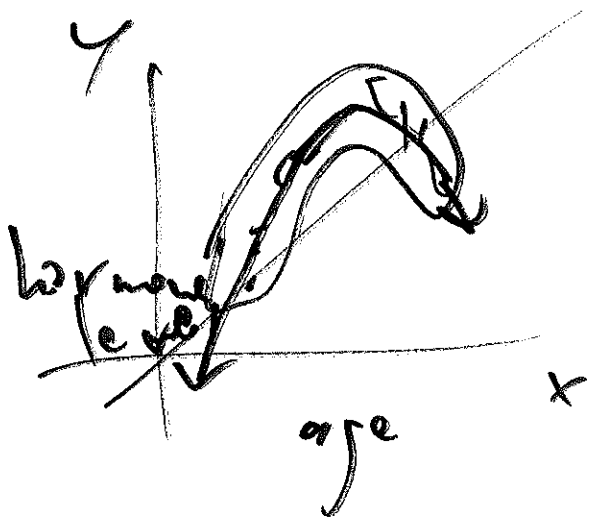
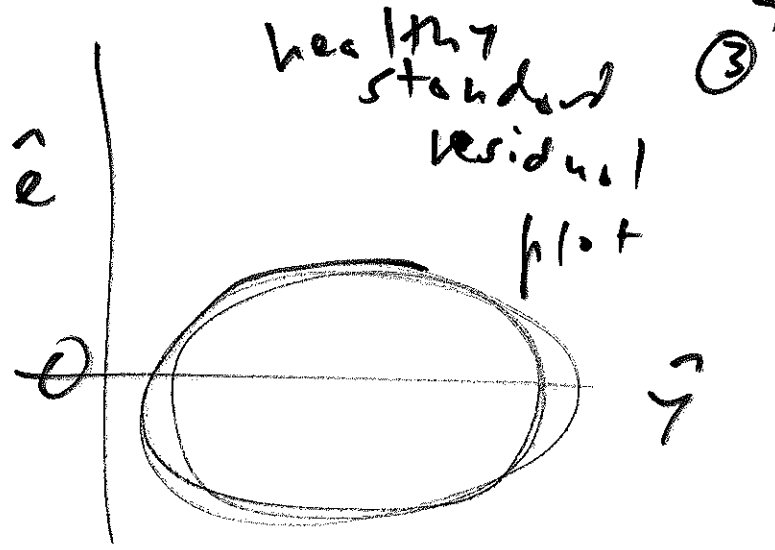
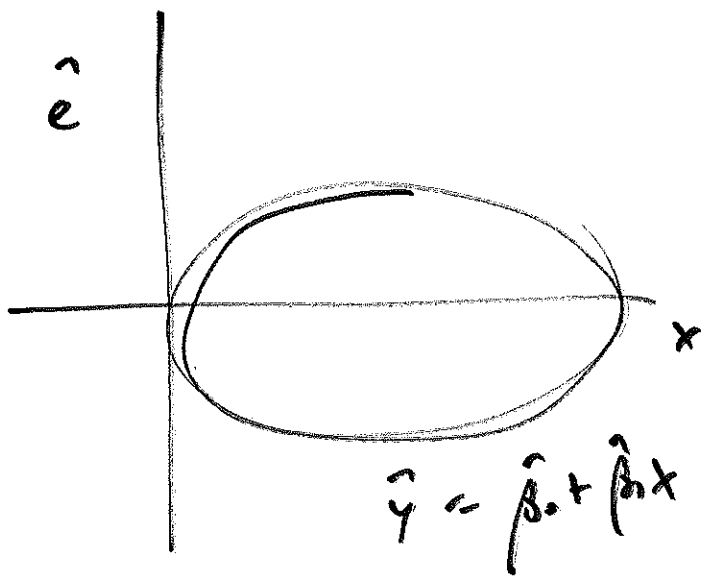
($i=1, \dots, n$) IID $N(0, \sigma_e^2)$

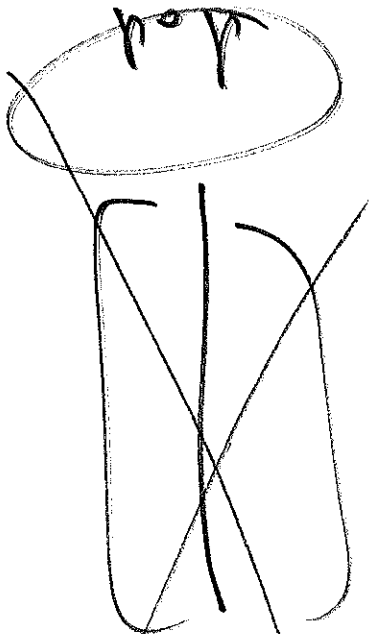
homoscedasticity
vertical
(same spread
in all vertical
strips)



$$\hat{e}_i = y_i - \hat{y}_i$$

= residuals





$k=1$



repeated sampling data set

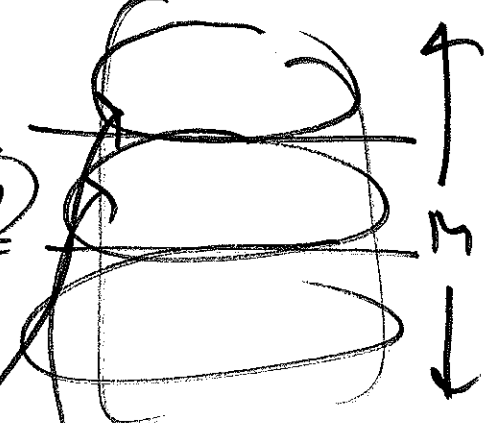
(4)

K.F. y_0

y	x
-----	-----

$n=157$

actual
IID



~~pop~~
 $E(y|x) = ?$

lower
 $E(y|x)$

need?

hyp IID

y	x
-----	-----

$n=157$

bootstrap data sets

$E(y|x)$

dist?

y	x
-----	-----

$n=157$

$E(y|x)$

bootstrap lower curves