AMS131
21 Aug 19
①

this time: covariance, correlation, conditional
next time: expectation, regression, utility

today: extra notes pp. 210 →

THT 2 due Fri night, quiz 7 due Sat night

freq.

X = # Latinx people selected for grand jury duty if T_1 true

T_1 : no discrimination

$X \sim$ Binomial$(n, 0.791)$, $n = 220$

$n = 220$
pop. % of Latinx = 79.1%

freq.

actually $x = 100$

$P(X \le 100 \mid T_1) \doteq 10^{-27}$

$\therefore T_1$ almost certainly wrong

Bayes: $P(T_1 \mid X = 100)$

Extra notes pp. 281 →

$$E(cX) = c \cdot E(X)$$

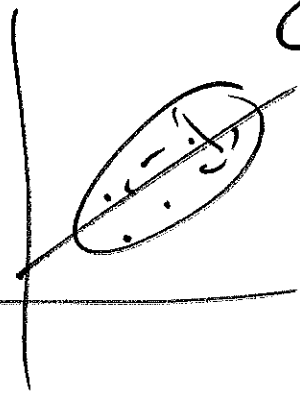
$$E(X + c) = c + E(X)$$

$$V(X + c) = V(X)$$

$$V(cX) = c^2 V(X)$$

$C(X + c, Y) = C(X, Y)$

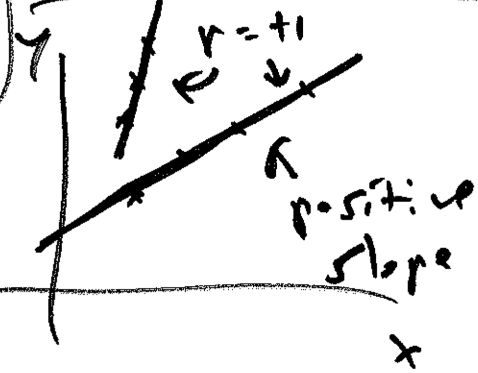
$C(cX, Y) = c\,C(X, Y)$



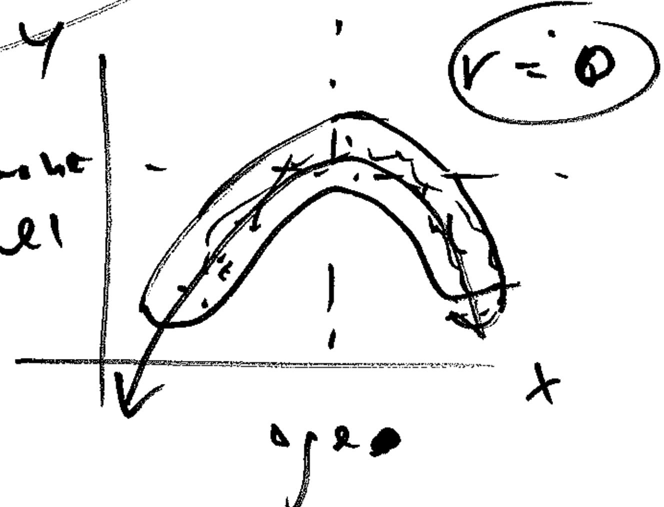
$$r = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i - \bar{x}}{s_x^*}\right)\left(\frac{y_i - \bar{y}}{s_y^*}\right)$$

$$s_x^* = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

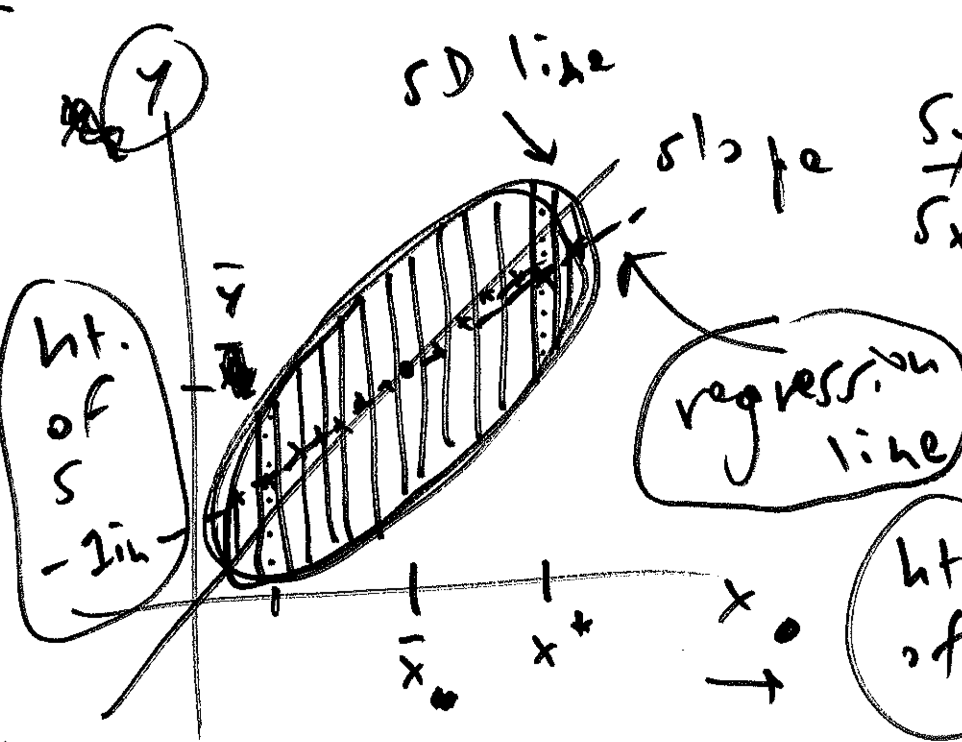
$-1 \le r \le +1$ ← perfect linearity with positive slope



(ρ)(r) can be fooled by outliers and/or nonlinearity



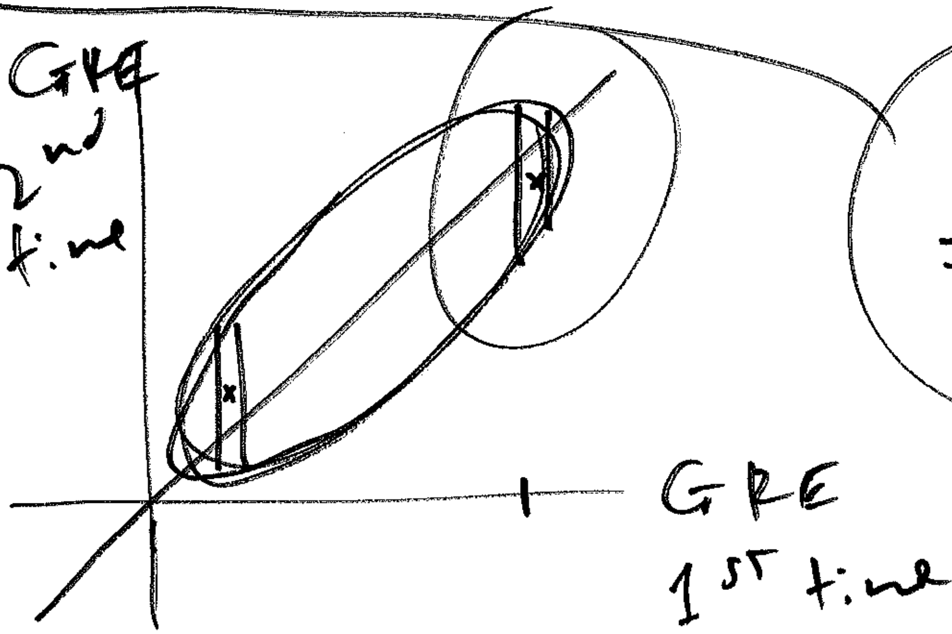
(10.04)

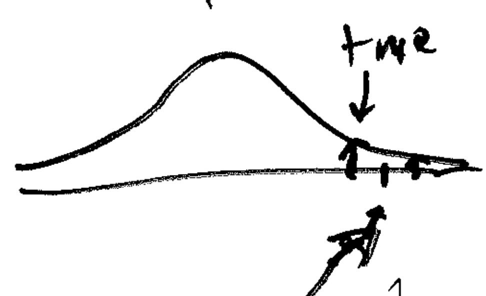


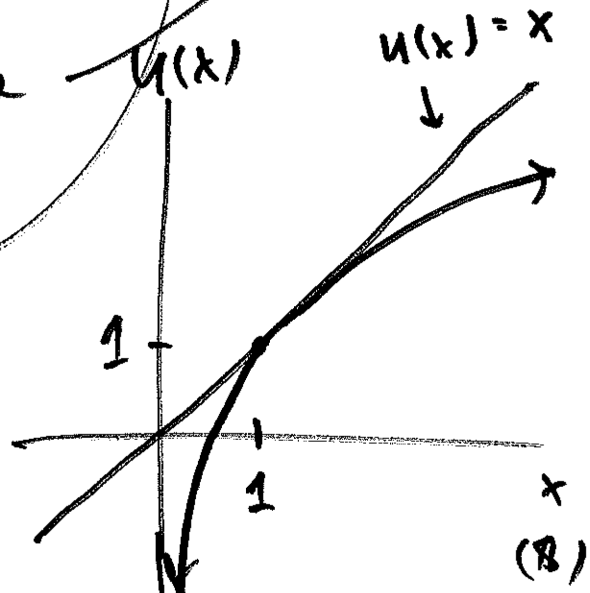
$E(Y \mid X = x)$

$\doteq$ approx. linear in x

regression effect (regression to the mean)







$u(x) = 1 + \log(x)$

(10.57)

action, unknown, benefit, cost

$$U(a, \theta) = g[\underline{\underline{B}}(a,\theta), \underline{\underline{C}}(a,\theta)]$$

cost-benefit analysis