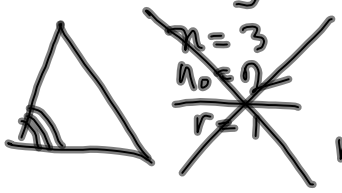
2-1

n: # obs

- n_0: min # obs to fix the model

r: redundancy = degrees of freedom

n: 3
n_0: 2
r: 1



~~$n = 3$~~
~~$n_0 = 2$~~
~~$r = 1$~~

obs. must determine model for redundancy

$\hat{\alpha}_1 + \hat{\alpha}_2 + \hat{\alpha}_3 = 180^\circ$

$\hat{\alpha}_1 = \alpha_1 + v_1$

$\alpha_1 + v_1 + \alpha_2 + v_2 + \alpha_3 + v_3 = 180^\circ$

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2-2

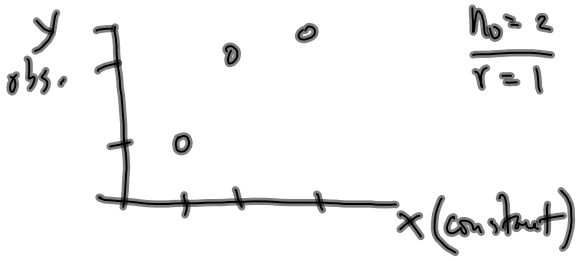
$\boxed{l_i + v_i = \hat{l}_i}$

(obs) (corr./residual) (adj. obs.)

$v_i = \hat{l}_i - l_i$

y: σ_y std. deviation

σ_y^2 variance



$n = 3$
$n_0 = 2$
$r = 1$

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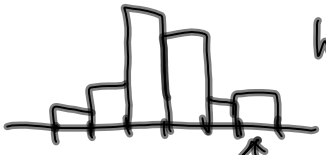
Uncertainty of obs

σ, σ^2, w = weight 2-3

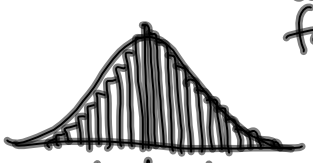


histogram

count of # of obs falling in interval

$w \sim \frac{1}{\sigma^2}$

proportional to "$\sim$"



increase # obs
decrease bin size
force area under curve = 1

$-\sigma$ $+\sigma$

probability density function

$+/- \sigma$: include ~ 68%

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$w_i \sim \frac{1}{\sigma_i^2}$ 2-4

$w_i = \frac{k}{\sigma_i^2}$

w_1, w_2, w_3 : 1, 2, 1
2, 4, 2
3, 6, 3

choice of k is arbitrary
just proportionality constant

how to pick k ?

(1) take a commonly occurring obs., make $k = \sigma^2$
$w = \sigma_i^2/\sigma_i^2 = 1$, $k = \sigma_0^2 =$
variance of unit weight
reference variance

(2) $k = 1$, $\sigma_i^2 = 1$

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2-5

$K = \sigma_0^2$ value that you choose is arbitrary
choice has no influence on outcome
be consistent, maintain throughout
the adjustment

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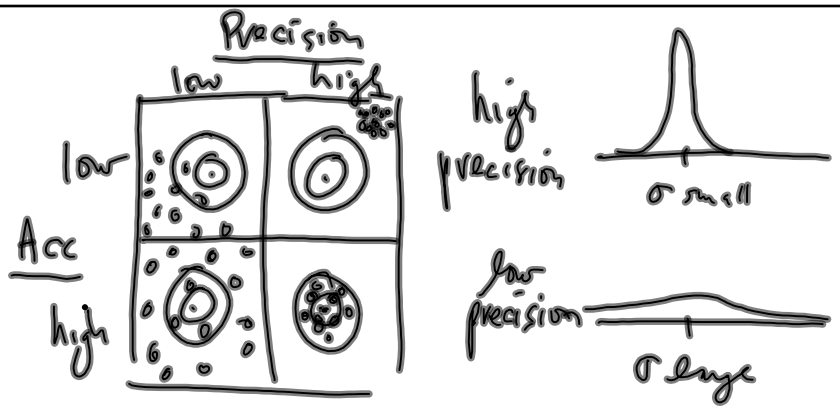
2-6



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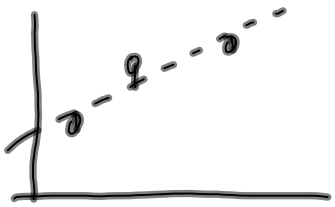
2-7



pick V's such that sum of squares of V's is minimized LEAST SQUARES Criteria

Φ = objective function = $V_1^2 + V_2^2 + V_3^2 \rightarrow \min$

$\Phi = \sum_{i=1}^{n} V_i^2$

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2-8

if Weights not all the same

$\Phi = W_1 V_1^2 + W_2 V_2^2 + \dots + W_n V_n^2$

by using LS we assume data is normally distributed

Corollary: if data not normally dist. then LS is not best obj. function

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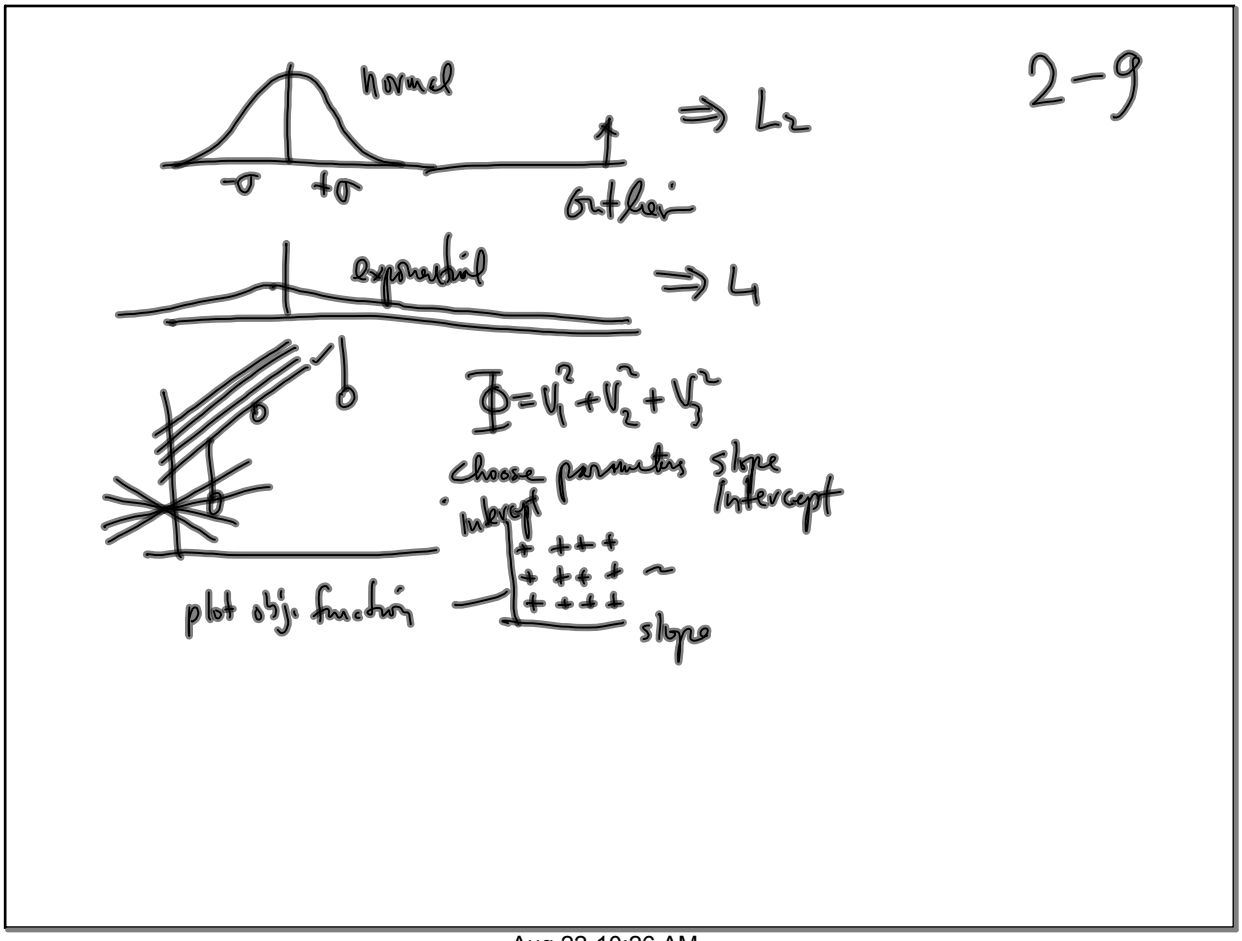

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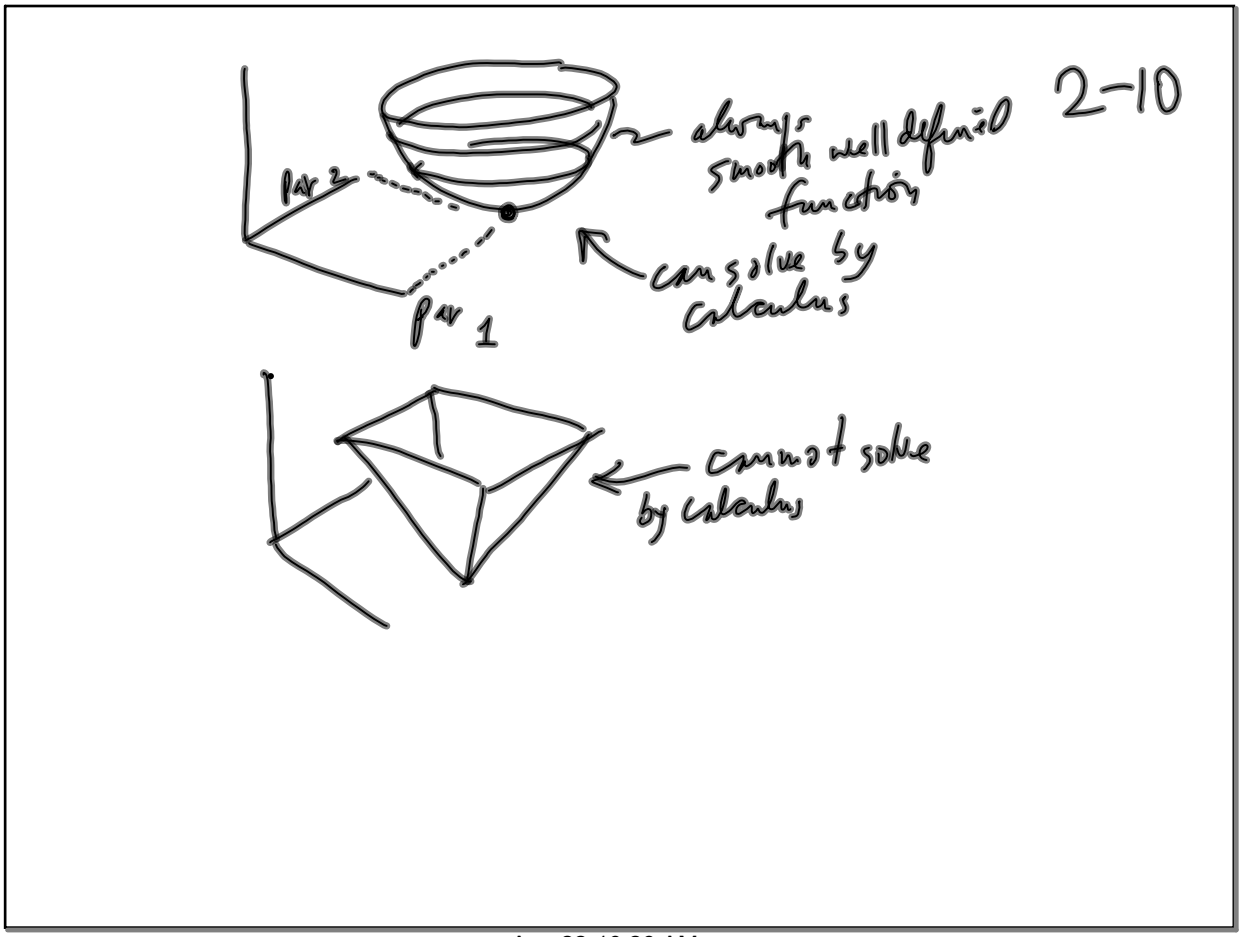

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