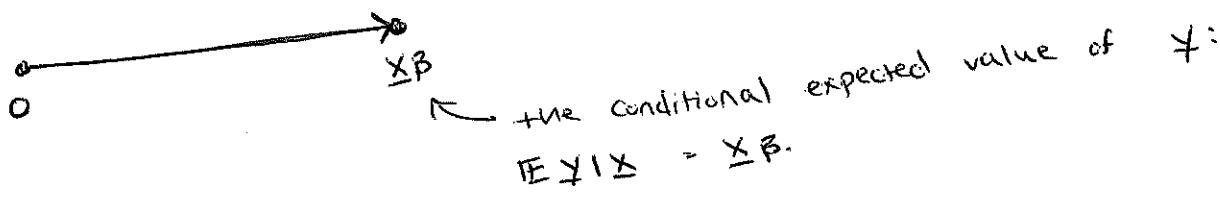


Why GLS? A picture:

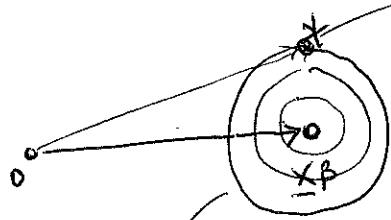
Consider $\underline{x} = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix}$, i.e. 1 measurement, no intercept.

The $\underline{x}\beta$ vector can be visualized:



OLS picture

$$y \sim N(\underline{x}\beta, \underline{\Sigma}^{\sigma^2})$$

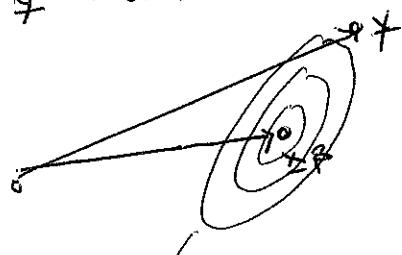


level curves
of MVN
w/ no covariance

if we observe y here,
we project straight
down.

GLS picture

$$y \sim N(\underline{x}\beta, \underline{\Sigma})$$



level curves of MVN with
covariance.



under this framework,
if we observe y
& are looking for projection
 \hat{y} , we should ~~also~~ project
along the principal axis
of the ellipsoid:

