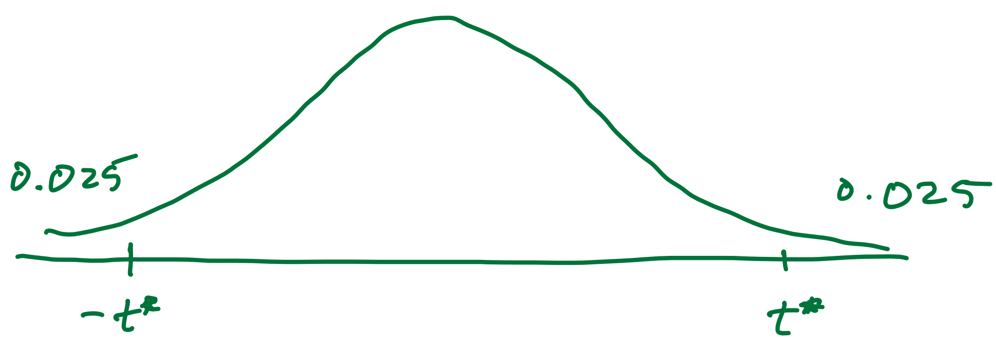
MONDAY OCT 30

- Homework clarifications
- Power
- Multivariate distributions - Covariance

  Multivariate Normal

Starting Wednesday : OFFICE HRS 12:30 - 1:30 MONDAY
WEDNESDAY

OR BY APT



UNIVARIATE

$$VAR = E[(X - EX)^2]$$

$$\text{SAMPLE VAR} = \frac{1}{n-1} \sum (x_i - \bar{x})^2$$

$$X = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} \qquad Y = \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix}$$

$$\text{COV}(X,Y) = E[(X - EX)(Y - EY)]$$

$$\text{SAMPLE COV}(X,Y) = \frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})$$

$$\underset{k\times 1}{X} = \underset{k\times k}{A}\ \underset{k\times 1}{Z}$$

If $\underset{k\times 1}{X}$ is $N(\underset{k\times 1}{\mu}, \underset{k\times k}{\Sigma})$

$$X_i = \sum_j A_{ij} Z_j$$

$$\Sigma_{ij} = \mathrm{cov}(X_i, X_j)$$

$$\mathbb{E}[X_i] = \sum A_{ij}\, \mathbb{E} Z_j$$

$$= 0$$

$$X = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_k \end{bmatrix}$$

If Σ is COV MATRIX OF $X = \begin{bmatrix} X_1 \\ \vdots \\ X_k \end{bmatrix}$

$$\underset{n\times 1}{Y} = \underset{n\times k}{A}\ \underset{k\times 1}{X}$$

$$\underset{n\times n}{\Sigma_Y} = \underset{n\times k}{A}\ \underset{k\times k}{\Sigma}\ \underset{k\times n}{A^T}$$