

Date: / /

التاريخ: / /

Subject: _____

موضوع الدرس: _____

مكمل

Conditional Probability

 $P(A \cap B) \rightarrow \underline{\text{And, Both}}$ $P(A \cup B) \rightarrow \underline{\text{OR, AT least one of them}}$ $P(A \cap B)' = 1 - P(A \cap B) \rightarrow \underline{\text{At most 1}}$ $P(A' \cap B') \rightarrow \underline{\text{None of them}}$ $\hookrightarrow P(A \cup B)' = 1 - P(A \cup B)$ $P(A \cup B) - P(A \cap B) \rightarrow \underline{\text{only one of them}}$ $P(A-B) \rightarrow A \text{ only}$

$$\hookrightarrow P(AAB') = P(A) - P(A \cap B)$$

 $P(B-A) \rightarrow \underline{\text{B only}}$

$$\hookrightarrow P(B \cap A') = P(B) - P(A \cap B)$$

$$P(A \cup B') = P(A) + P(B') - P(A \cap B')$$

$-P(A) + P(A \cap B)$

$$= P(B) + P(A \cap B)$$

 $\Phi = 2\pi$ $\phi = 180^\circ$

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Rule of Probability :-

1) complements

الأحداث المكملة

ex:

$$S = \{1, 2, 3, \dots, 10, \text{Boy}, \text{girl}, \text{King}\}$$

$$A = \{1, 2, 3, \dots, 10\}$$

$$P(A) = \frac{10}{13} \rightarrow P(A') = \frac{3}{13}$$

$$\rightarrow P(A') = 1 - P(A)$$

2) Additive rule

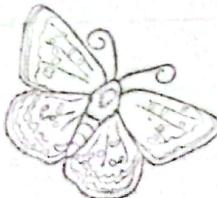
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = // - P(A \cup B)$$

3) exclusive rule

$$A \cap B = \emptyset$$

$$P(A \cap B) = 0$$



A) DeMorgan's Laws

$$\rightarrow P(A' \cap B') = P(A \cup B)' = 1 - P(A \cup B)$$

$$\rightarrow P(A' \cup B') = P(A \cap B)' = 1 - P(A \cap B)$$

E) Conditional Probability

$$P(B/A) = \frac{P(A \cap B)}{P(A)}$$

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

$$\left. \begin{aligned} P(A \cap B) &= P(B/A) * P(A) \\ &= P(A/B) * P(B) \end{aligned} \right\}$$

F)

independent events

With replacement

$$P(B/A) = P(B)$$

$$P(A/B) = P(A)$$

$$P(A \cap B) = P(A) * P(B)$$

G) Total Probability Theory

نظرية الاحتمالات المركبة

$$A = A \cap B_1 + A \cap B_2 + \dots$$

$$P(A) = P(A \cap B_1) + P(A \cap B_2) + \dots$$

$$P(A \cap B_i) = P(A/B_i) * P(B_i)$$

$$P(A) = P(A/B_1)P(B_1) + P(A/B_2) * P(B_2) + \dots$$



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TIPS FOR SOLVING

$$P(X_1 / W) = \frac{(B \cap A)^9}{(A)^9} = \frac{1^9}{1^9} = 1$$

الخطوة المطلوب بالأسئلة

لـ $P(X_1 / W)$

BAY'S RULE

$$P(B / X) = \frac{P(B \cap X)}{P(X)}$$

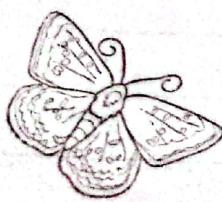
$$= \frac{(B \cap A)^9}{(A)^9} = \frac{1^9}{1^9} = 1$$

$$= \frac{P(X / B) \times P(B)}{P(X)}$$

$$(A)^9 = (A)^9$$

$$(A)^9 = (A)^9$$

$$(A)^9 \times (A)^9 = (B \cap A)^9$$



$$= 0.1 + 0.1 = 0.2$$

$$= 0.1(A \cap A)^9 + 0.1(A)^9 = 0.2(A)^9$$

$$(A)^9 \times 0.1(A)^9 = 0.1(A)^9$$

$$+ 0.1(A)^9 + 0.1(A)^9 + 0.1(A)^9 = 0.4(A)^9$$

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Subject: موضع الدرس:

Ch3 : probability distribution function

Probability mass function

(Discrete prob distribution)

probability density function

(continuous prob distribution)

$$f_{\text{prob}}(x) = \frac{x^2 + 1}{30} \quad (x=1,2,3,4,5)$$

$$f(x) = \frac{x^2 + 1}{30} \quad 1 \leq x \leq 4$$

لوجاريتمي

Conditions for all x

i) $0 \leq f(x) \leq 1$

ii) $\sum_{\text{all}} f(x) = 1$

Conditions

i) $0 \leq f(x) \leq 1$

ii) $\int_a^b f(x) dx = 1$

$$\text{Mean } \bar{x} = \sum x \cdot f(x)$$

$$\text{Mean } \bar{x} = \int_a^b x \cdot f(x) dx$$

$$\text{Variance } \sigma^2 = \sum x^2 \cdot f(x) - (\bar{x})^2$$

$$\text{Variance } \sigma^2 = \int_a^b x^2 \cdot f(x) dx - (\bar{x})^2$$



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Subject: Ch3: Random Variable & Prob dist. Functions موضوع

1) Discrete Prob dist function [mass function]

$$f(x) = \boxed{\quad} \quad x=1, 2, 3, 4, 5 \quad f(x) \rightarrow \text{Probability}$$

$$\text{Def: } \left\{ \begin{array}{l} \text{① } 0 \leq f(x) \leq 1 \\ \text{② } \sum_{\text{all}} f(x) = 1 \end{array} \right\} \quad \left\{ \begin{array}{l} \mu = \bar{x} = E(x) = \text{Avg value} \\ = \text{expected value} = \sum_{\text{all}} x f(x) \end{array} \right.$$

Variance: $S^2 = S^2 = \text{Var}(x)$
 $= [\sum x^2 f(x)] - \mu^2$

2) continuous prob dist function [density func]

$$f(x) = \boxed{\quad} \quad 1 < x < 4$$

$$\text{Def: } \left\{ \begin{array}{l} \text{① } 0 \leq f(x) \leq 1 \\ \text{② } \int_{\text{range } x} f(x) dx = 1 \end{array} \right.$$

$$\mu = E(x) = \int_{\text{range } x} x f(x) dx$$

$$\text{Var}(x) = \left[\int_{\text{range }} x^2 f(x) dx \right] - (\mu)^2$$

Discrete

Continuous

Special case:



① Hypergeometric dist

② Binomial dist

③ Poisson dist

① Normal dist

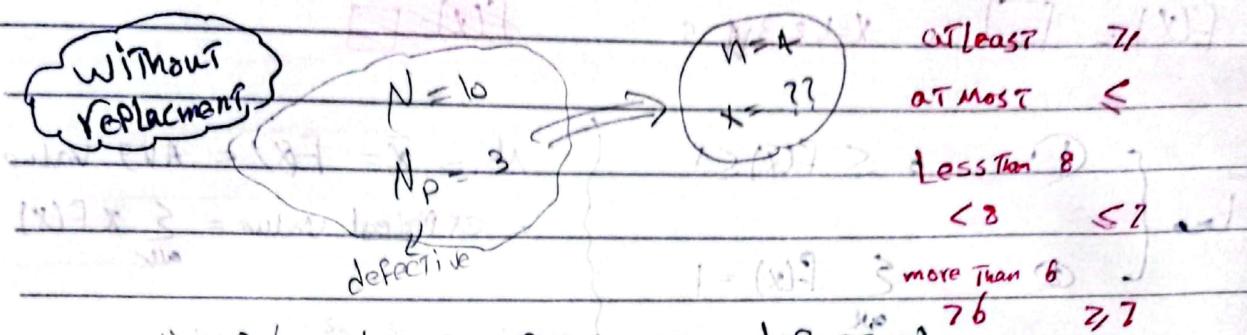
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Subject: الوحدة الثالثة والرابعة المحضون EN

موضوع الدرس:

1 Hypergeometric dist

1) $P(\text{at least } 2 \text{ cars are defective})$

$$P(X \geq 2) = f(2) + f(3) + f(4)$$

defective

2) $P(\text{at most } 2 \text{ cars are good})$

$$P(X \leq 2) = f(0) + f(1) + f(2)$$

good

$$f(x) = \frac{\frac{N_p}{N} C_x * \frac{N-N_p}{N} C_{n-x}}{N C_n}$$

$$P(X \geq 2) = \frac{3C_2 * 7C_2}{10C_4} + \frac{3C_3 * 7C_1}{10C_4}$$

$$P(X \leq 2) = \frac{7C_2 * 2C_2}{10C_4} + \frac{7C_1 * 3C_3}{10C_4}$$

$$\mu = n \frac{N_p}{N}$$

$$\sigma^2 = \frac{n N_p (N-n)(N-N_p)}{N^2(N-1)}$$

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2] Binomial dist (with Replacement)

$$P = 0.3 \quad n = 4 \quad X = ?$$

defects

$$P(X \geq 2) = P(2) + P(3) + P(4)$$

$$\stackrel{L^2}{\text{Derivative}} = AC_2(0.3)^2(0.7)^2 + AC_3(0.3)^3(0.7)^1 + AC_4(0.3)^4(0.7)^0$$

$$P(X \leq 2) = P(0) + P(1) + P(2)$$

$$\stackrel{L^2}{\text{good}} = AC_0(0.7)^2(0.3)^2 + AC_1(0.7)^3(0.3)^1 + AC_2(0.7)^4(0.3)^0$$

$$f(x) = {}^n C_x * (P)^x * (q)^{n-x}$$

$$M = np$$

$$S^2 = npq$$

لوشن مدد
لعيت
بهبيت هعن اللي
اداهولن



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موضوع الدرس:

3) Poisson distribution: توزيع بواسون

OK!

* معلم حدوث حدث معين

X احتمال كل صفحه $\lambda = 3 \text{ errors / Page}$ $x = 3?$
مثلاً في 2 pages ثقب 1 في الفاصل

P(she makes at least 2 errors in the next page)

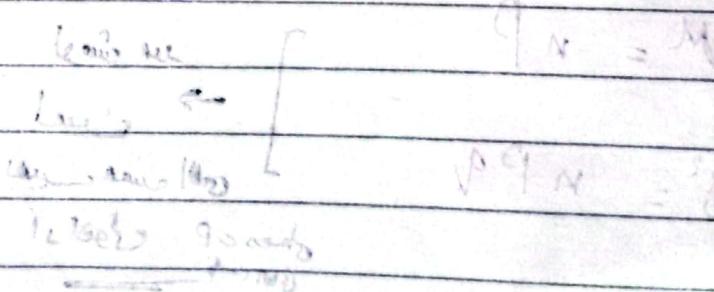
$$P(x \geq 2) = 1 - [P(x \leq 1)] = 1 - [F(0) + F(1)]$$

طبع 6 = 2 pages

$$F(x) = \frac{e^{-\lambda} (\lambda)^x}{x!}$$

$$\text{Mean} = \text{Variance} = \lambda$$

$$2? \leftarrow 2 \text{ pages} \leftarrow \text{Mean} \rightarrow \text{لومالب}$$



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Subject: موضوع الدرس:

Hypergeometric \rightarrow Binomial

N, N_p, n, x $P = \frac{N_p}{N} \binom{n}{x}$

Hyper \rightarrow لو $\frac{N_p}{N} \leq 0.05$ \rightarrow ينطبق على \rightarrow Binomial *

* أول وملب اى اهل بالطريقين

Binomial \rightarrow Poission

$D = v, n=v \rightarrow x ? \rightarrow \lambda = np$

على Poission \rightarrow تحول $n \uparrow \uparrow \uparrow$ و $P \downarrow \downarrow \downarrow$ *

* أول وملب اهل تكذا ملرقة برسنو



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Continuous dist

Normal dist

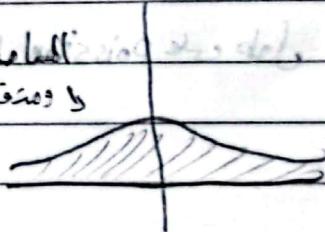
$$f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-(x-\mu)^2/2\sigma^2}$$

دالة طبيعية
دالة طبيعية

دالة طبيعية

Standard Normal dist

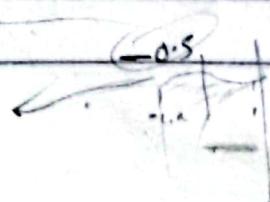
$$P\left(z < \frac{x-\mu}{\sigma}\right)$$



والآن؟

- * من يصرخ اهش العجل بالصالب فجعله مريحة
- * اقوى رفع موجب ورقم صالب يقسم معاشرن واحد معن من كل اعمال

الكوني زاحف معاشرة مرته ساين



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Ch 4 Confidence Interval

& Test of Hypothesis

$$T \square < \mu < \square$$

نسبة < confidence Level

One Population

1 shift لوسائل

Two Population

2 shifts

Population

 μ σ^2 σ

Sample

 $\bar{x} - \mu$

$$S^2 = \frac{\sigma^2}{n}$$

$$S = \sqrt{\frac{\sigma^2}{n}}$$

(n) ↑ ↑ ↑ \rightarrow زوجات العجم

II one population

$$\alpha = 1 - \text{Confidence Level}$$

a) Z Known

$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

$$\bar{x} - \left[Z_{\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}} \right] < \mu < \bar{x} + \left[Z_{\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}} \right]$$

b) Z unknown & $n \geq 30$

$$Z = \frac{\bar{x} - \mu}{S / \sqrt{n}} \quad n - \left[1 - \left(1 - \frac{S}{\sigma} \right)^2 \right] < \mu < n + \left[1 - \left(1 - \frac{S}{\sigma} \right)^2 \right]$$

c) Z unknown & $n < 30$

$$t \in = \frac{\bar{x} - \mu}{S / \sqrt{n}}$$

$$n - \left[t_{\frac{\alpha}{2}} \times \sqrt{n} \right] < \mu < n + \left[t_{\frac{\alpha}{2}} \times \sqrt{n} \right]$$

Two Population:

1) σ_1, σ_2 Known

$$Z = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

جبر

$(\bar{X}_1 - \bar{X}_2) - Z_{\alpha/2} * \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} < \mu_1 - \mu_2 < (\bar{X}_1 - \bar{X}_2) + Z_{\alpha/2} * \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$

2) σ_1, σ_2 unknown $n_1, n_2 \geq 30$

$$Z = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$s_1^2 = \frac{\sum (x_i - \bar{x})^2}{n_1}$

3) σ_1, σ_2 unknown $n_1, n_2 < 30$

$$\bar{T}_n = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$S_p = \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \cdot \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$$

$$S_p = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}}$$



$$N = n_1 + n_2 - 2$$

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$Z_{\frac{\alpha}{2}}$ \rightarrow نصف العدالة او $\frac{\alpha}{2}$ يعتمد على normal dist

$$\cancel{Z_{\frac{\alpha}{2}}} \rightarrow 1 - \frac{\alpha}{2} = 0.98$$

* لد ارقم هست موجود اجيب الى قيمه واللى بعده واجمعهم واقسم على الـ 2
كم وهب

$t_{\frac{\alpha}{2}}$ \rightarrow نصف جدول الـ t-dist \rightarrow $(\frac{\alpha}{2}, \sqrt{v})$ \rightarrow degree of freedom
آخرها $\frac{v}{2}$ freedom

* أولاً ماجد \leftarrow population \rightarrow sample Ig
بعد تدوين اهداف المتغيرات



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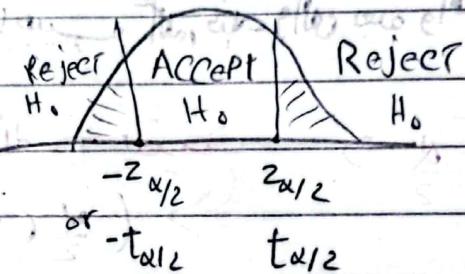
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Critical Region

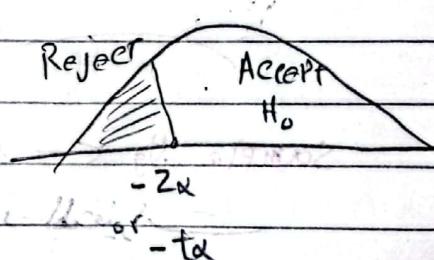
* $H_1: \mu \neq \dots$

$\mu_1 \neq \mu_2$



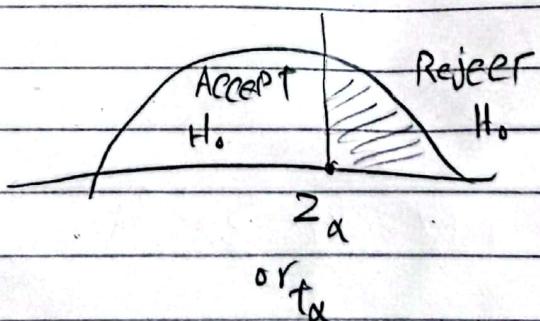
* $H_1: \mu < \dots$

$\mu_1 < \mu_2$



* $H_1: \mu > \dots$

$\mu_1 > \mu_2$



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Test of Hypothesis

Step 1) null Hypothesis

$$H_0: \mu = \bar{\mu} \quad \mu \leq \bar{\mu} \quad \sigma^2 \geq \bar{\sigma}^2$$

$H_0:$

$$\mu_1 - \mu_2 = 0 \quad \mu_1 - \mu_2 \leq 0 \quad \mu_1 - \mu_2 \neq 0$$

Alternative

Step 2: ~~Alternative~~ Hypothesis

$$H_1: \mu \neq \bar{\mu} \quad \mu > \bar{\mu} \quad \mu < \bar{\mu}$$

$$\mu_1 \neq \mu_2 \quad \mu_1 > \mu_2 \quad \mu_1 < \mu_2$$

Step 3: Level of significance

$$\alpha = \text{given} \quad 1 - \text{Confidence Level}$$

Step 4: Test statistic and Critical Region

$Z = \underline{\hspace{10cm}}$
OR
 $t = \underline{\hspace{10cm}}$

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Step (5) Calculations

$Z =$ احسب المعادلة

or

$t =$ بازدحام

Step (6) conclusion

ACCEPT H_0

من المرض

or

reject H_0

لما عدته بازدحام

H_1 ضد H_0 ← Default *

لو وردت ادلة على اشتغال بعزم

null H_0 العذر نسبة بحيرة يكون اد *

note = X

$$(\bar{X}_L - \bar{X}_U) + \text{كم} M_L - M_U \leq (\bar{X}_2 - \bar{X}_1) +$$





1/9/2004

النوع

الثلث

محافظة العنوان

الشرقية

قسم / مركز الشرطة

قسم أول الزقازيق

العنوان بالتفصيل

ناوبي الجديد/أول الزقازيق/ش. سلل بن رياح

أقرب رقم تليفون



GIF



...



q 1 w 2 e 3 r 4 t 5 y 6 u 7 i 8 o 9 p 0

a s d f g h j k l

↑ z x c v b n m ⌂

?123



English

.

