Apoorva on niverom

2) Binomial distribution ~ Bin (n, TI):

Taking log on both sides

let log (T) = 0 => &T = e0 => T = e

$$1-TT = 1-e^{0} = 1$$

fyly,0,\$)=enp/y0-b(0)+c(y,\$)y-10.

we get,
$$0 = \log \left(\frac{T}{1-TT} \right)$$
, $\phi = 1$, $b(\theta) = m \log \left(1 + e^{\theta} \right)$

5 ALEYN STANKEN ELY) = M = 16(0) of = M = (M) $= me^{\theta} = m\pi$ anarpedies $1+e^{i\theta}$ $= qb''(\theta)$ $m(e^{\theta})$ = 12 me = me = min(1-t) = 12 me = me = min(1-t) = 12 me = min(1-t) = 12 me = min(1-t)To show: g(u) = 0. me = 4 = 4 = e = TT $\Rightarrow 0 = \log \left(\frac{\pi}{1 - \pi} \right) = \log \left(\frac{u / m}{1 - u / m} \right)$: Logit function is the canonical unik for binomial distribution.

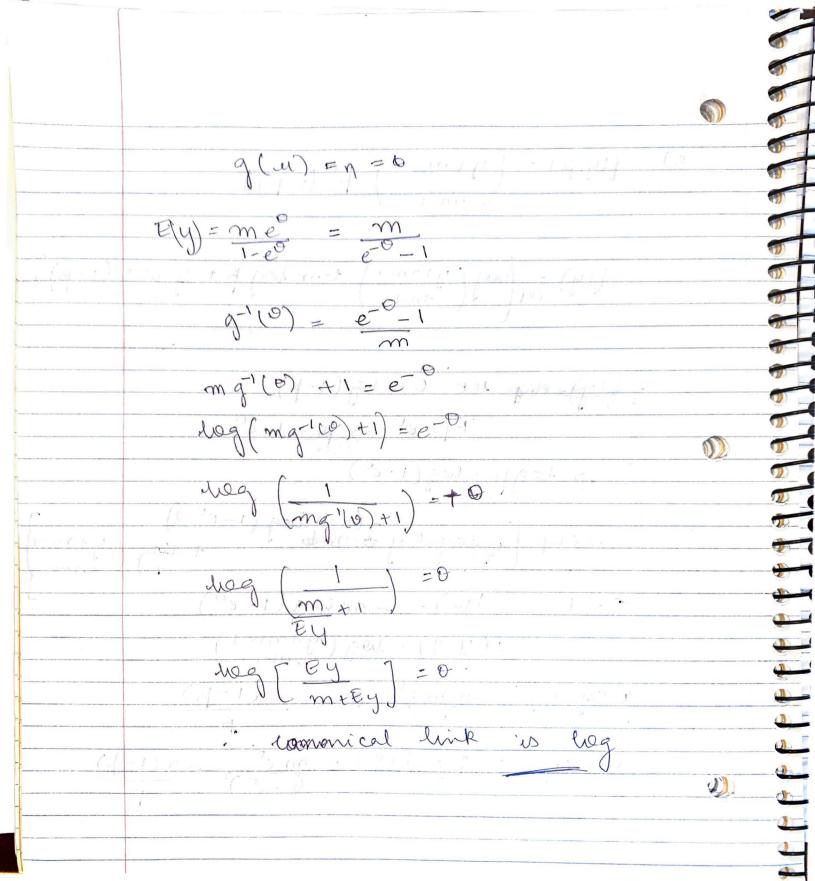
Aporava Sorinivasa as5697

Poisson distribution Pois (1) Taking log lobs fly) = end of y long 1 - 1 - long (yi) 4-0 To show: Company Day 111 11 12 2 E(4) = 100 b (0) = de = 1 = 1 Val (4) = $\phi b''(\theta) = d e^{\theta} = e^{\theta} = \lambda$.

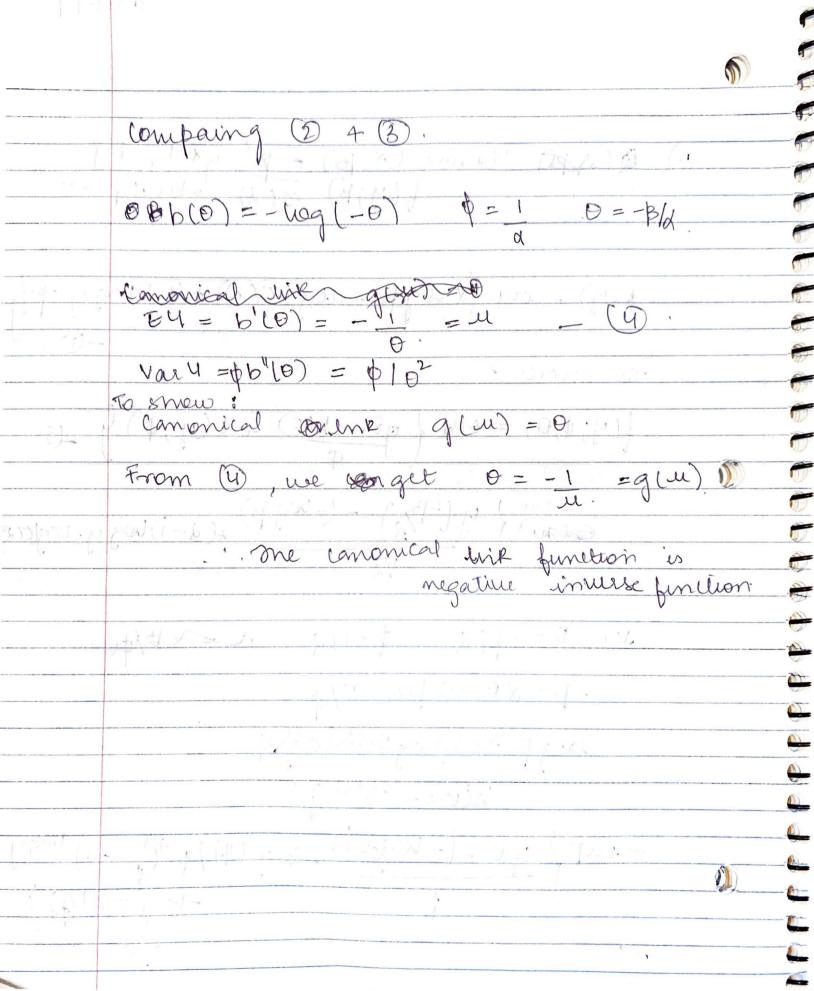
Canonical link: $g(u) = \theta \Rightarrow To show$. $\lambda = e^{\theta} \Rightarrow log \lambda = \theta$ with for Poisson distribution.

= f(y) = log (y+m-1) + m log p + y log (1-p) etyp let 0 = log (1-p) 1-B=e = B=1-e log/s = hog (1-e0) = enf (your Oy de moto (1-e0)) + log (y+m-1) do) = - m log (1-e0) ccy, \$ = was (y+m-1) Ector Ey = + me & = m(1-b) Val(y) = \$0 b(0) = me = r(1-b)

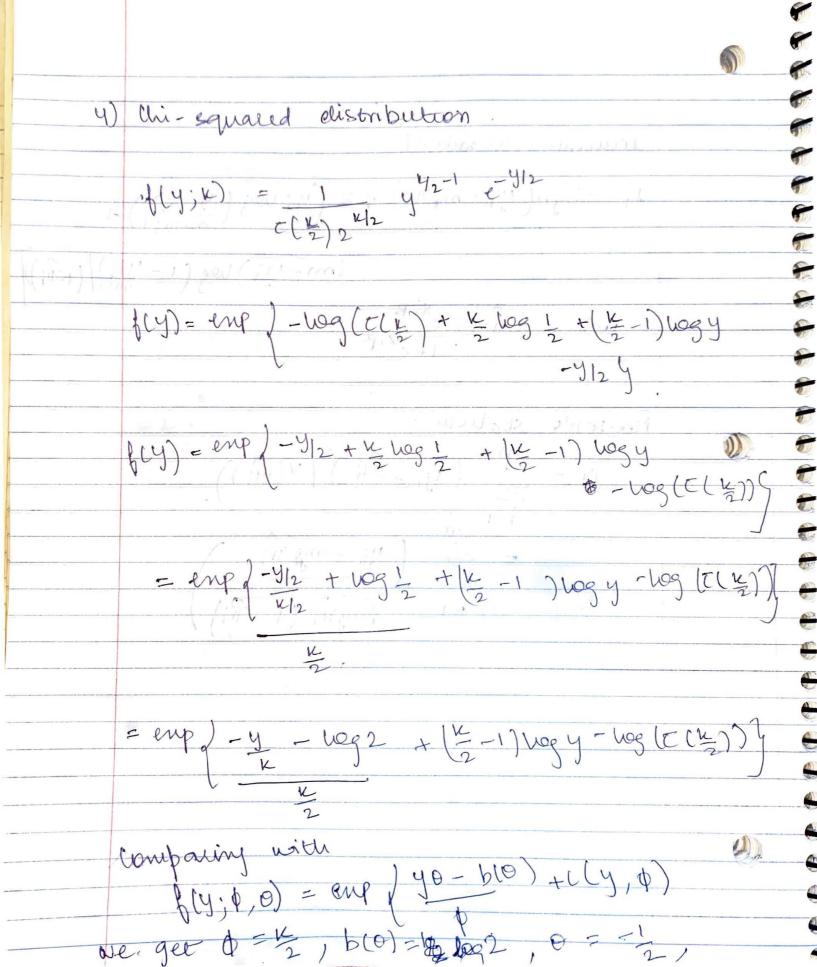
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6) Parpo Garma (x p) = pd yd-1e-by (y; p) T(d) where d, p > 0 fcy) - eng of log p - log (C(d)) + (a-1) log y - by To smow $f(y,\phi,0) = enf \int_{Q} y\theta - b(\theta) + c(y,\phi) \int_{Q} d\theta$ $= enp \int_{Q} y(-\beta) - (-\log \beta) + (d-1)\log y - \log(\alpha \beta)$ let 0 = - B/d 0 = 1/2 -B=XB=>B=-0/0 100 B 3 100 B = enp/ 40-[-log-0] - log (1)/0 + (1 -1) logy - log T (1/0) 9



Emp(1) b(4:1) = 1 = 4 fly) = enp / log1 - ly 4 - 0. Comparing with y 0,0) = enp | by 0-b(0) + c(y,0) 4 [2 0= -11-3- => 1=-0. = enf loy - (- log(-0) we get b(0) = b(0) = 1 = 1 = u ... g Var 4 = \$6"(0) = -1 = 1 To smow: g(u) = 0 From Q M = -1 > 0 = -1



Problem 3) & (4: , TT) = TT 4 (1-TT) 1- 4: Log-weensood; (14,717) = 2 [4; nogt + (1-4;) log(1-17)] S(-11) = D(24,T) = 2 [41 - 1-41] $= \frac{\pi}{2}y_{1} - \frac{\pi}{2}(1-y_{1})$ $= \frac{\pi}{1-\pi}$ $= \frac{\pi}{2}y_{1} - \pi - \frac{\pi}{2}y_{1}$ $= \frac{\pi}{1-\pi}$ $= \frac{\pi}{1-\pi}$ $= \frac{\pi}{1-\pi}$ Hoseume $y = \frac{1}{n} = \frac{2}{1} = \frac{1}{1} = \frac{1$ = my(1-17) - m(1-1819) TI $\frac{1}{\pi(1-\pi)} = \frac{\pi y - \pi y}{\pi(1-\pi)}$ 'FOR MLE, put (D) =0 A

ny = nT => TIME = y

$$I(\pi) = E \left(-\frac{2i(y, \pi)}{0i^{2}} \right)$$

$$= E \left(-n\pi(1-\pi) - n(y-\pi)(1-2\pi) \right)$$

$$= \frac{\pi^{2}(1-\pi^{2})}{\pi^{2}(1-\pi^{2})}$$

$$= m\pi(1-\pi) + m(y-\pi)(1-2\pi)$$

$$= m\pi(1-\pi)$$

$$= \frac{\pi^{2}(1-\pi)}{\pi^{2}(1-\pi)}$$

$$= \frac{\pi^{2}(1-\pi)}{\pi^{2}(1-\pi)}$$

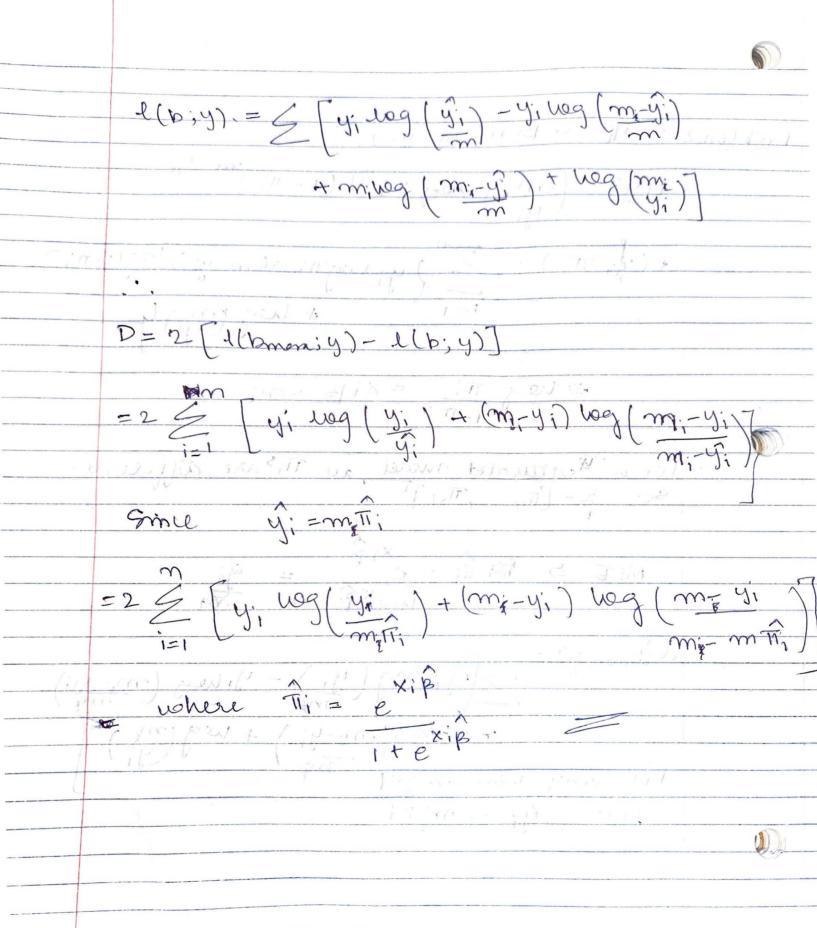
$$= \frac{\pi}{\pi^{2}(1-\pi)}$$

$$= \frac{\pi}$$

 $T_0 = 0.3$, T = 0.3, T = 10. (11 $75_{s} = 10(0.3 - 0.3)^{\frac{1}{2}}$ $\frac{1-0.3}{15} = 0 = 2 \left[10.03 \log_{1} + 10 \left(1 - 0.3 \right) \log_{1} - 0.3 \right] = 0$ $TS_{40} = J_{10}(b.3 - 0.5)^{2} = 1.9$ 0.3(1-0.3)N 155 = 10 (0.3 -0.5) = 1-6 75 p=2 [1010340] 0.3 + 10 (1-0.3) (1-0.5] e1.65. 3) Not all of them.

Problem ?: 4, ~ Bin (m, Ti) fry) = [m,) log Ti; Si (1-Ti;)m-yi $\ell(y_i, \pi_i) = \sum_{i=1}^{m} \ell(y_i, \pi_i) \log \ell(\pi_i)$ + hog my => log Tri = XiB = mi For a treatmented model, au Tis are different. MLE = XIB = Ji I (bonon, y) = [y; log (y;) - Yilleg (m;-yi) mg) + mlog(m,-y;) + heg(m;) For any other model

Let y; = m; Tii



deliance residual di=singn(yi-miti) 12 (yi wag (yi miti))+ (m-yi) wg (1-4i) (1-Ti) where Ti = e xiB Peouson's Statistic: 4: - m; Ti;