$f(y;0,\phi) = \exp \left\{ \frac{y0-b10}{a(p)} + \frac{c(y,\phi)}{a(p)} \right\}$ mean 6/10), varience 6/10) a(q) Ex! Normal N(M, 8) fly/M, 8= exp[yy - 122+...] $\sqrt{2\pi}e^{2\pi} \left(-\frac{(4-14)^{2}}{2e^{2}} \right)^{2}$ $\sqrt{2\pi}e^{2\pi} \left(-\frac{(4-14)^{2}}{2e^{2}} \right)^{2}$ Ex 2 Poisson flyin)= µ et = exp{ylogn-µ-log (y!)} 0= log µ blod = µ = e blod = e = µ y=0,1,2, Ex3 Bio. Binomial Let y be the proportion of successes in n brials with proby mass = p= 14 $f(y;n,p) = (n_y)p^{ny}(1-p)^{n-ny}$ $y=0, \frac{1}{n_1, \frac{2}{n_1, \dots, 1}}$ = exp{ nylogp + n(1-y)log(1-p) + log(ny)} = exp { nylog } + nlog (1-p)+--} $= \exp \left\{ \frac{y0 - b(0) + --}{4} \right\}$ $b(0) = + \log (1 + e^{b}) \quad b'(0) = \frac{e^{0}}{1 + e^{0}} = 1 - \frac{1}{1 + e^{0}} \quad p = \frac{e^{0}}{1 + e^{0}}$ $b''(0) = \frac{e^{0}}{(1 + e^{0})^{2}} = p(1 - p) \quad (= p) \quad |-p = \frac{1}{1 + e^{0}}$ $\text{Mean} = b'(0) = p \quad \text{Var} = \phi b''(0) = \frac{p(1 - p)}{n}$

fly; μ, ν) = β y e σ ος ς σο

Pla mean & var. &

β y e β ος γ σος σο

Pla mean μ var. &

β γ σος με γ $\phi = \frac{1}{15} = \frac{1}{$ $= \exp \left(+ \frac{y - 0}{a(\phi)} + \frac{c(y, \phi)}{b(0)} \right)$ $b(0) = \log 0 \quad b'(0) = \frac{1}{0} = \mu \quad b''(0) = -\frac{1}{0} = -\mu^{2}$ $variance of y : b''(0) \cdot a(\phi) = (-\mu^{2})(-\frac{1}{\nu}) = \mu^{2}$ Inverse Gaussian (Formary (A, 9)

Fly; M, λ) = $\left(\frac{\lambda}{2\pi y^3}\right)^{\frac{1}{2}} \exp\left\{-\frac{\lambda(y-\mu)^2}{2\mu^2 y}\right\}$ $\mu > 0$ Inverse Gourssian (Foraway (4,9) $= \exp\left\{-\frac{\lambda y}{2\mu^2} + \frac{\lambda}{\mu} - \frac{\lambda}{2\mu} + \frac{1}{2}\log\left(\frac{\lambda}{2\pi y^3}\right)\right\}$ $\phi = \frac{1}{\lambda} \alpha(\phi) = -\phi \quad 0 = \frac{1}{2\mu^2}$ $\mu = (20)^{\frac{1}{2}} b(0) = \frac{1}{\mu} = (20)^{\frac{1}{2}} b'(0) = 2^{\frac{1}{2}} \cdot \frac{1}{2}0^{\frac{1}{2}} = (20)^{\frac{1}{2}}$

 $b''(0) = -(20)^{-3/2}$ Mean $b'(0) = (20)^{\frac{1}{2}} = \mu + \frac{b''(0)}{b(0)} = Mean$ Variance is $b''(0) q(p) = (20)^{\frac{3}{2}} = \mu^3$ Louis Bachelier (1900)