1] $RR = \frac{\pi_1}{\pi_2}$ $= \frac{\frac{\pi_1}{1-\pi_1}}{\frac{\pi_2}{1-\pi_2}}$

$$OR = \frac{\pi_1(1-\pi_2)}{\pi_2(1-\pi_1)}$$

$$= RR \cdot \left(\frac{1-\pi_2}{1-\pi_1}\right)$$

$$\left[RR \cdot \frac{1-\pi_1}{1-\pi_2}\right]$$

$$PD = \frac{2}{\lambda(1+\lambda)} \sum_i n_i \left[\left(\frac{n_i}{\hat{\mu}_i} \right)^{\lambda} - 1 \right] \quad , -\infty < \lambda < \infty$$

When $\lambda = 1$ $= \chi^2$

$$\left[\sum_i (n_i - \hat{\mu}_i) = 0 \right]$$

Putting $\lambda = 1$,

$$= \frac{2}{1 \cdot (1+1)} \cdot \sum n_i \left[\left(\frac{n_i}{\hat{\mu}_i} \right) - 1 \right]$$

$$= \sum_i n_i \left(\frac{n_i - \hat{\mu}_i}{\hat{\mu}_i} \right)$$

$$= \sum_i \frac{n_i^2 - n_i \hat{\mu}_i}{\hat{\mu}_i}$$

$$= \sum_i \frac{n_i^2 - n_i \hat{\mu}_i}{\hat{\mu}_i} - \sum_i \left(n_i - \hat{\mu}_i \right)$$

$$= \sum_i \left(\frac{n_i^2 - n_i \hat{\mu}_i - n_i \hat{\mu}_i + \hat{\mu}_i^2}{\hat{\mu}_i} \right)$$

$$= \sum_i \frac{\left(n_i - \hat{\mu}_i \right)^2}{\hat{\mu}_i} = \chi^2$$

$$G^2 = 2 \sum_{i=1}^{K} n_i \log_e \left(\frac{n_i}{m_i} \right)$$

Let $n = \sum_i n_i$ &

$$p_i = \frac{n_i}{n} \Rightarrow n_i = n.p_i$$

$$\therefore G^2 = 2n \sum_i p_i \ln \left(\frac{n_i}{m_i} \right)$$

$$= -2n \sum p_i \ln \left(\frac{m_i}{n_i} \right)$$

Let X be a r.v taking value

$\frac{m_i}{n_i}$ w.p p_i $\left[\& \ 0, \text{o.w} \right]$ $\sum(O_i - E_i)$ $= 0$

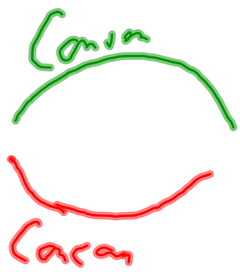
$$\therefore E(X) = \sum_i p_i \cdot \frac{m_i}{n_i}$$

$$= \sum_i \frac{n_i}{n} \cdot \frac{m_i}{n_i} = \sum_i \frac{m_i}{n} = 1$$

$$\& \ E[\log X] = \sum_i p_i \cdot \log_e \left(\frac{m_i}{n_i}\right)$$

$\because \log_e X$ is concave

$$E[f(X)] \quad f[E(X)]$$



$f = \log$

$$E[\log X] \le \log[E(X)] = \log(1) = 0$$

$$\therefore G^2 = -2n \sum_i \hat{p}_i \ln\left(\frac{m_i}{n_i}\right) = -2n\, E(\log X) \ge 0$$

$(-) \cdot (\le 0)$