9.6 : Cochran's Test For related observations

H_0: The treatments are equally effective
H_a: Not all equally effective.

or

$H_0: p_1 = p_2 = \cdots = p_c$ within each block
H_a: Not all equal " "

Test Statistic

$$T = c(c-1)\frac{\sum_{j=1}^{c}\left(C_j - \frac{N}{c}\right)^2}{\sum_{i=1}^{r} R_i(c-R_i)}$$

Hand Calculation

$$T = \frac{c(c-1)\sum_{j=1}^{c} C_j^2 - (c-1)N^2}{cN - \sum_{i=1}^{r} R_i^2}$$

Block	Treatment 1	2	----	c	Row total
1	x_{11}	x_{12}		x_{1c}	R_1
2					
⋮					
r	x_{r1}	x_{r2}	- - -	x_{rc}	R_r
	C_1	C_2		C_c	N

grand total

Cont. 4.6

If $c = 2$ use

$$T = \frac{(c_1 - c_2)^2}{\sum_{i=1}^{r} R_i (2 - R_i)}$$

Note: Same as McNemar's test

$$T = \frac{(c-b)^2}{b+c} = \frac{(b-c)^2}{b+c}$$

reject H_0 if

$$T > \chi^2_{1-\alpha}(1)$$