Ch. 13. STA-3123 Test of Independence Sec 13.3

Two factors. (1) Job satisfaction (Rows), (2) Salary level (Columns)

$r = 3$, $c = 3$, $n = 310$

Job Satisfaction	Salary < 25000	Salary 25000 – 35000	Salary > 35000	Total	
High	20 (25.81)	20 (16.13)	10 (8.06)	50 =	R_1
Medium	100 (103.23)	65 (64.52)	35 (32.26)	200 =	R_2
Low	40 (30.97)	15 (19.35)	5 (9.68)	60 =	R_3
Total	160 = C_1	100 = C_2	50 = C_3	310 =	n

E_{11} Expected Cell 11 $= \frac{50 \times 160}{310} = 25.81$ E_{12} Cell 12 $= \frac{50 \times 100}{310} = 16.13$ E_{13} Cell 13 $= \frac{50 \times 50}{310} = 8.06$

Cell 21 $= \frac{200 \times 160}{310} = 103.23$ Cell 22 $= \frac{200 \times 100}{310} = 64.52$ Cell 23 $= \frac{200 \times 50}{310} = 32.26$

Cell 31 $= \frac{60 \times 160}{310} = 30.97$ Cell 32 $= \frac{60 \times 100}{310} = 19.35$ Cell 33 $= \frac{60 \times 50}{310} = 9.68$

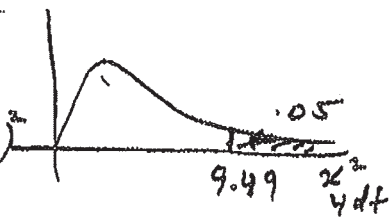
(1) H_0: Job satisfaction is independent of salary level

H_a: Job satisfaction is dependent on salary level.

(2) $\alpha = .05$

(3) Test statistics $\chi^2 = \sum \frac{(O-E)^2}{E}$ $df = (r-1)(c-1) = 2 \times 2 = 4$

(4) Rule: Reject H_0 if $\chi^2 > 9.49$



(5) Compute $\chi^2 = \frac{(20-25.81)^2}{25.81} + \frac{(20-16.13)^2}{16.13} + \frac{(10-8.06)^2}{8.06}$

$+ \frac{(100-103.23)^2}{103.23} + \frac{(65-64.52)^2}{64.52} + \frac{(35-32.26)^2}{32.26}$

$+ \frac{(40-30.97)^2}{30.97} + \frac{(15-19.35)^2}{19.35} + \frac{(5-9.68)^2}{9.68}$

$\chi^2 = 1.308 + .929 + .467$
$+ .101 + .004 + .233$
$+ 2.633 + .978 + 2.263 = 8.916$

Do not reject H_0 $\Rightarrow$ Not sufficient evidence to conclude that job satisfaction depends upon salary level.