d A	mo Module		ear somph	May mah	antina , Morale	4 0
ANOVA - An alysis	of Variance	1 with	little manon			Stranger .
H6=11=12=		Durag	Experience	Mis 1	J. F. J. A.	
One way classit	cation	tost.	Tig	J.		4
completely Rad	omized der	ign (cro)		001	Q [2	
			8.8	011	2 5	
A B	Cı	. 81=M	F 2	801	st	
a, b,		F = .0	F B	511	5 g	
a ₂ b ₃		$n_s = 6$	3 F	811	8 8	
ani	C_{n_2}		1816	120 F01	088.	
				3-3 C		
2.	B 2C	381 - (18	16. FOFF.	088) =	7.9	4.5%
N= Acto	l no. of data		81			
C.F 2	ZA+ ZB+ Z	(84) (7	(c) + (08	6)		
forther of		7	+ 3	7 = 32	&.	
SSC = (8	A) + (EB)	f8-100F1	6 4 0 388 C	, -)2.0		CE
Sum of square	n_1 n_2 = $a_1^2 + a_2^2 + \cdots$	an't bi	bn +C	2 +Cn	4	
			C 4	11200		
2 . Som of 281 - 1 (2	= 351-3-	2 F) F (2	B+(oF) =	T22		÷
sam of same	7.1633	3E1 - FOF	2 mg	7:22		-
a une		12.5	3-3 : 1.	10	-	
Source of	Degru of Greedom	ای ف	MSS	322	F	
Column	No. of _ 1)se	MSSC = 322 Do	CORR F =	M S S C	> 1
Estos	N-1:	SSE	322 -324 SE	198	1	and the state of t
The same	(no. 0. 60 mm -1)	350	Do	f bec	arm p	South Contract
SHOE Total FEEL	N-1	10 2FJ2 F	3.7	- = F=	MSSE:	5/2/

2.542A BI -1-81

Loter

F > 15.05 (2.05)

28.6 5 (21.2) 2007

3 make 4 rope and stury measured with fillewing results I II II II II II I I I I I I I I I I	A random &	pear Sample	is selected in from	each of the
T II II Test when the breaking strongth and 100 60 11.0 65 4 is sopen differently 120 48 11.2 84 11.5 120 48 12.0 48 1		mpes and &	their break	or one
T II	measured with	following the	sults of	
70 100 60 72 110 65 73 108 57 N=18 80 112 84	-			
75 108 57 N=18 80 112 84 N=5 83 113 87 N=6 107 431 770 C.F = $(380 + 70 + 113)^2 = 138864.5$ 18 2SC = $28880 + 81700 + 3096017 - 138864.5$ 2SC = $28880 + 81700 + 3096017 - 138864.5$ 2SC = 5675.67 2ST = $145707 - 138864.5$ 2ST = $145707 - 138864.5$ 2ST = $145707 - 138864.5$ 2ST = 6842.5 2ST = $6842.$		<u> </u>	O II STA	then en il
75 108 57 N=18 80 112 84 N=5 83 113 87 N=6 107 431 770 C.F = $(380 + 70 + 113)^2 = 138864.5$ 18 2SC = $28880 + 81700 + 3096017 - 138864.5$ 2SC = $28880 + 81700 + 3096017 - 138864.5$ 2SC = 5675.67 2ST = $145707 - 138864.5$ 2ST = $145707 - 138864.5$ 2ST = $145707 - 138864.5$ 2ST = 6842.5 2ST = $6842.$		(U.S	1 of the ropes of	ab a a La Hally my
80 112 8H	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			fort min
80 83 113 87 120 $\frac{48}{107}$ $\frac{1}{107}$ $\frac{1}{1$	4 -	N		/1
$380 120 48 107 431 $ $770 18 107 431 $ $2 \cdot C \cdot F = (380 + 370 + 470 + 473)^{2} = 138864.5$ $3 \cdot C = (380)^{2} + (370)^{2} + (43)^{2} - 138864.5$ $3 \cdot C = 28880 + 34700 + 30960.17 - 138864.5$ $3 \cdot C = 5 \cdot C75 \cdot 67.67.67.67$ $3 \cdot C = 5 \cdot C75 \cdot 67.67.67$ $3 \cdot C = 14 \cdot 5707 - 138864.5$ $3 \cdot C = 14 \cdot 5707 - 138864.5$ $3 \cdot C = 166.83$ $3 \cdot C = 1166.83$ $3 \cdot C$	80 112	411		
$ \begin{array}{c} 107 & 431 \\ \hline 770 & \\ \hline \end{array} $ $ \begin{array}{c} C \cdot F = \left(380 + 470 + 43\right)^{2} = 13886 \text{ H. } S \\ \hline 18 & \\ \end{array} $ $ \begin{array}{c} 8SC = \left(380\right)^{2} + \left(\frac{470}{2}\right)^{2} + \left(\frac{43}{2}\right) - 13886 \text{ H. } S \\ \hline 3SC = 28880 + 84700 + 30960.17 - 13886 \text{ H. } S \\ \hline 3SC = 5675.67.41 - 13886 \text{ H. } S \\ \hline 3SC = 5675.67.41 - 13886 \text{ H. } S \\ \hline 3ST = [70]^{2} + (72)^{2} + (75)^{2} + \dots + (78)^{2} - 13866 \text{ H. } S \\ \hline 3ST = 6842.5 - 36 \end{array} $ $ \begin{array}{c} 9ST = 6842.5 - 36864.5 - 3676.67 $	83 113	87 n	2 ° 1 n. = 6	as ba
$C \cdot F = (380 + 470 + 43)^{2} = 13886 + .5$ $8SC = (380)^{2} + (370)^{2} + (43)^{2} - 13886 + .5$ $8SC = 28880 + 84700 + 30960.17 - (13886 + .5)$ $8SC = 5675.67.$ $8SC = 5675.67.$ $8SC = 5675.67.$ $8SC = 5675.67.$ $8SC = 1166.83$ $8SC = $	380	-		
$C.F = (380 + 470 + 43)^{2} = 13886H, S$ 18 $8SC = (380)^{2} + (470)^{2} + (43)^{2} - 13886H, S$ $SSC = 28880 + 8H700 + 30960.17 - 13886H, S$ $SSC = 5675.67$ $SST = (70)^{4} + (42)^{4} + (45)^{4} + \dots + (46)^{4} - 13886H, S$ $SST = (70)^{4} + (42)^{4} + (45)^{4} + \dots + (46)^{4} - 13886H, S$ $SST = (842.5)$ $SSE = 1166.83$ $SOURCE = (842.5)$ $SSE = (842.5)$ $SSE = (64.67)$ $SSE =$		-	cn ₂	id IND
$8SC = (380)^{2} + (770)^{2} + (43)^{2} - (38864.5)$ $SSC = 28880 + 84700 + 30960.17 - (138864.5)$ $SSC = 5675.67$ 8872 $9ST = (70)^{4} + (72)^{2} + (75)^{2} + \dots + (76)^{2} - (138664.5)$ $SST = 145707 - 138864.5$ $SST = 6842.5$ $SSE = 6842.5$ $SSE = 6842.5 - 5676.67$ $SSE = 1166.83$ $Source of Source o$	4		L and Range	
$8SC = (380)^{2} + (770)^{2} + (43)^{2} - (38864.5)$ $SSC = 28880 + 84700 + 30960.17 - (138864.5)$ $SSC = 5675.67$ 8872 $9ST = (70)^{4} + (72)^{2} + (75)^{2} + \dots + (76)^{2} - (138664.5)$ $SST = 145707 - 138864.5$ $SST = 6842.5$ $SSE = 6842.5$ $SSE = 6842.5 - 5676.67$ $SSE = 1166.83$ $Source of Source o$	C·E = (38	0+770+43)	= 13886H.5	281.83
SSC = 28880 + 84700 + 30960.17 - (138864.5) SSC = 5675.67. SST = (70) + (72) + (75) + + (78) - 138864.5 SST = 145707 - 138864.5 SST = 6842.5 SSE = 6842.5 - 5676.67 SSE = 6842.5 - 5676.67 SSE = 1166.83 Column		18	6 cocos fr. coc	wish = U
SSC = 28880 + 84700 + 30960.17 - (138864.5) SSC = 5675.67. SST = (70) + (72) + (75) + + (78) - 138864.5 SST = 145707 - 138864.5 SST = 6842.5 SSE = 6842.5 - 5676.67 SSE = 6842.5 - 5676.67 SSE = 1166.83 Column	9.95 - (380) (730)	(1.21) 129864	E) = 9:5
SCC = 5675.67! $SCT = 1451 + (75)$				
SCC = 5675.67! $SCT = 1451 + (75)$	220	7 888 D + 0 888 C	0+30960.17 - 13	3886H·Z
$SST = (70)^{\frac{1}{2}} + (75)^{\frac{1}{2}} + \cdots + (76)^{\frac{1}{2}} - 138664.5$ $SST = 145707 - 138864.5$ $SST = 6842.5$ $SSE = 6842.5$ $SSE = 6842.5$ $SSE = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SSE = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ S	43 - 43 - 4	124 mg + 1.1	3 10 7 10	
$SST = (70)^{\frac{1}{2}} + (75)^{\frac{1}{2}} + \cdots + (76)^{\frac{1}{2}} - 138664.5$ $SST = 145707 - 138864.5$ $SST = 6842.5$ $SSE = 6842.5$ $SSE = 6842.5$ $SSE = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ $SSE = 1166.83$ $SOUTH = 32.66$ $SS = 1166.83$ S	SSC =	2 5675,67.	これ かい ナール さい	= T 2). PW- B
SST = G842.5 $SSE = 1166.83$ $SSE = 1166.83$ $SOUTCE OF SOUTCE OF SOUTCE$	897	C2 (L) L Ga) ²	1752+ +(7	8) - 138664.5
SST = G842.5 $SSE = 1166.83$ $SSE = 1166.83$ $SOUTCE OF SOUTCE OF SOUTCE$	881	2 (40) + (72)	1 - 1366(F)	23 55 Sept 15
$SST = 86.42.5$ $SSE_{1} = 6842.5 - 5645.67$ $SSE_{2} = 6842.5 - 5645.67$ $SSE_{3} = 1166.83$ $SOUTCE of South of South$	22	1 2 14 2 10	1 1 0 0 0 1 1 1 0	Legis p
SSE = 1166.83 $SSE = 1166.83$ $SOUTH = 1200$ $SS = 1166.83$ $SOUTH = 1200$ $SS = 1166.83$ SS	<u> </u>	ST = 6842.	The state of the s	*
Source of Nonintrom 2 M 3-1 = 2 5675.67 $\frac{1166.88}{2}$ $\frac{1166.88}{15}$	38	E =2MST - S		•
Source of Noninkom Dof SS MSS F Column M 3-1 = 2 5675.67 $\frac{5675.67}{2} = 2837.83$ $\frac{2837.83}{777.79} = 36.48$ Erros $17-2=15$ 1166.88 $\frac{1166.88}{15} = 77.79$ Total $18-1=17$ 6842.5 $F > F_{0.05}(2,15)$	SSE SSE	= 6842.5-	567567	100 DOV
Source of Noniahron M Dof: SS MSS F Column M 3-1 = 2 5675.67 $\frac{5675.67}{2} = 2837.83$ $\frac{2837.83}{777.79} = 36.48$ Error 17-2=15 1166.88 $\frac{1166.88}{15} = 77.79$ Total 18-1=17 6842.5 F> Fo.os (2,15) = 3.68.	t < -1556.	100	T - forest	ir m o Jaš
Source of Noniahron M Dof: SS MSS F Column M 3-1 = 2 5675.67 $\frac{5675.67}{2} = 2837.83$ $\frac{2837.83}{747.79} = 36.48$ Error 17-2=15 1166.88 $\frac{1166.88}{15} = 77.79$ Total 18-1=17 6842.5 F> F _{0.05} (2,15) = 3.68.	437 10 SSA	322 2321M	122 -1-11	Yorej
Column 3-1 = 2 5675.67 $\frac{5675.67}{2} = 2837.83$ $\frac{9837.83}{777.79} = 36.48$ Error 17-2=15 1166.88 $\frac{1166.88}{15} = \frac{1166.88}{15} = 1$			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	F
Error $17-2=15$ 1166.88 $\frac{1166.88}{15}=77.79$ Total $18-1=17$ 6842.5 Foos $(2,15)=3.68$.				9837-83 26.48
Total 18-1=17 6842.5 tolli Fo.os (2,15) = 3.68. F> Fo.os (2,15)	CONUMN 3-1 = 1		2 = 283.70	77,79
Total 18-1=17 6842.5 tolli Fo.os (2,15) = 3.68. F> Fo.os (2,15)	Error 17-2=	1166.88	15 = 77.79	
A STATE OF THE STA	Total 18-1:	= 17 6842.5		
	Indle Fo.os (2,15) = 3.68.		F > F _{0.05} (2,15) -
Reject Ho.	1990		Reject Ho.	

The following of the number mistakes made in 5 successive days by It technicians working for a photographic laboratory test wheather the difference among the 4 sample mean can be attributed to chance The I would be to the Total N = 20 Harman arm IM. 410 n, = 5

Ho: M1 = M2 = M3 = M4

wask ()

yourds on	Dof	\$ 2	1 1 2 M	~
Column	3	12.95	= 6,35	F= 6.35 = 1.47
Total	19	NH·35	16 F 8	-318
	16 2) = 29.8	3		

+0.01 (76,3) =

F < Fooi (16,3)

-Accept to.

```
* 2 way classification randomised block design
a following data supresents no. of Units of production por day
     Lorned out by different workers using 4 diff types of 2 meching
                                         Fest whether the 15 men differ
          machine Type.
                                        with respect to the mean productivity
                           D
                                        and also test wheather the mean
                      Ċ
               B
         A
                            36 = 165
                                        productivity is some for 4 different
                      HA
               38
    I AH
                          H3=181
                   5 2
                                       machines.
III 34
              40
                   HH 32 = 146
              36
    ₩ 43 38 , 49 33= 190
        38 42 49 39 = 168
205 194 238 183 820
                                         ( 42 + 22 + 10)
    Ho: MA = MB = Mc = MD
           MI= MI = MI = MI
     D.
       N = 20
       CF 2(820)<sup>2</sup> 233620
       SSC = \frac{(205)^2 + (194)^2 + (238)^2 + (183)^2 - 33620}{5}

SSC = 338.8
      SSR = \frac{(165)^{2} + \frac{(181)^{2} + \frac{(146)^{2}}{4} + \frac{(160)^{2} + \frac{(168)^{2}}{4} + \frac{1}{4}}{4}}{4} + \frac{(160)^{2} + \frac{(168)^{2}}{4} + \frac{1}{4}}{4}
           SSR = 161.5
        SST = HH^{2} + 38^{2} + H^{2} + 36^{2} + \dots + 39^{2} - 33620
SST = HH^{2} + 38^{2} + H^{2} + 36^{2} + \dots + 39^{2} - 33620
         SSE = SST - SSC - SSR
                                         12.95
          95E = 574-338.8-161.5
                                                          21
          SSE = 73.7
                                         26-411
                                                         101
                                                For (16,3) = 24.83
```

1 < 100 (16,3)

variation	Hoot	116 88	+ on MS,S	4- EH.	FORKF	* 1.55
Glumn	4-1 = 3	338.88	338 /8	12.9 14 2	Fc/ = 112.0	- z 18.2
ROW	5-1 = H	161.5	161, x = 10	0.36	FR = 40.3	3 = 6, 1
Ermy	12	73.7	73.7 2 6.	1 155 .	1,55 - 1	2.0
Total	19	574	- 58	+2 11	15 = 355 19 = 355	?
ulo -	2,02 (3,13) = 3		Fc>f	6.05 (3	3,12)	
F	bios (4,12) = 3	226	Rejut	Ho	100	Vidualin S
	£9.E23	80-14	1.8 Ryw	tho g.	3-1-2	1 de les vie
Q A	Company Map	points 4 &	ales men	A, B, C ter 4 m	anson.	romg
XV-	Sales men	of god , man	(1)	.3 80	1.1	lotor
A	B(4,8) 35			-	ind analysi nudel (E) 10	
A POSSIBLE OF THE STREET	भ छ । अह _ा	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			05 (2,6) =	160
Monison 39	39 41H to	H 160	The second second	1 9 9 M		1 4
127 Ros	4 120 124 $4 128 124$ $4 128 128$ $4 128 128$	र कार्य में	RED and	12 4	19 19 19 19 19 19 19 19 19 19 19 19 19 1	
25)(0)	$u_1 = u_2 = u_3$	120,27		loud 21	the tr	E. Analys
N =	12	1 10 1	411	56	Jacobs se f	@
CF = 1	$\frac{41 = 41 = 43}{12}$ $= 12$ $\frac{(487)^{2}}{12} = 1$ $= 127^{2} + 120$ $= 1978$	9764.08	3 8 50	06	11 21	В В
SSC =	$\frac{124^2}{3} + \frac{120}{3}$	$+\frac{124^{2}}{3}+\frac{11}{3}$	62 197	64.08	2 17	_. 8
3.	2 1111		1	7. 6	11 31	
	sc = 22.		189 Hi	0 %	21 11	a a
SSR	$=\frac{160^2}{14}+\frac{16}{16}$	7 + 160	O'lla	۱۹۶ - کو	164·0 8	1.
	₂ 1977	2.25 -19	764.08	= ,T 12	- , 12 - , 1	u joh
1 17 1	2 8.	17	will all	ع کرائے د	,3 ¹² = ,3 ¹²	

SST =	452+	432 +392 +	402+ 1	112 - 19764.08
				E = T - H. To may
			191- 2 - 191- 2	
SSE	= SST -	- 22.92 -	8.17	, v. es
\$ \$	E = 40	, 45,83	* * * * * * * * * * * * * * * * * * *	Pl Jadar
F 18 17	(=1,29	20.07	e it	·8 = (818) × 4
Some of Nacation	Dof	Reject 212	1	F 7
Column	4-1 =3 51	122.92	22.92 = 7.64	7.64 2 1 001
Rono ha	3-1 = 2	8 17 7 Call	8.17 2 4.08	7.63 2 1.001
rong	L. C. Com	7 5 83 mm	45.83 2 7.63 vino 6 consens	1904.081920.53 A
Total	# . 11 .	76,92		
J3 14	filers bos	to person		com rolo 8
The S Foro		धना प्रमि	A ccep.	+ the 8 3,6) A Junnos
Fo.0	s (2,6) = €	FEB 5.14	Fe C	Fo. 05 (2,6) 14 EH WAIN
	(2,6) = 1		4100	710,
Solve . Solve	(1.1.6) * 5 T		and draw 4	our conclusion
& Analyse	the follo	wing RBD		off = all = All : It
	Treatment	•	2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3,12) eus.49
B	T ₁ T ₂	73 4	4 0.0% (18,4) = 2:41 = 14
€ _ B,	12 14	20 22	68 30 M9 tb	$I = \frac{1}{5} (F8H) = 73$
B_2	17 27	19 15 80.113 F.P.I.	C8 - 11 + 121 + 1	0 <u>S</u> 1 + <u>F</u> 21 = 122
B ₃	15 14		689.43FF1- F	
Вц	18 16	22		
Bs	19 15	20 14		32c = 2d.
	81 0.186.	98 Fr	340) + 1001 = 455
u :0H	T, = UT. = 1	Ut, = 1174	42.25 - 19764.	FPI
J	Ug, 2 Ug, 2	UB, 2 UB, = 1	l _{BC}	8 0

Nzdo

$$CF = \frac{(340)^{2}}{20} = 5780$$

$$SSC = \frac{81^{2}}{5} + \frac{86^{2}}{5} + \frac{98^{2}}{5} + \frac{45^{2}}{5} - 15780$$

$$SSC = 5837 \cdot 2 - 5780$$

$$SSC = 57 \cdot 2$$

$$SSC = \frac{68}{4} + \frac{78^{2}}{4} + \frac{58^{2}}{4} + \frac{68^{2}}{4} + \frac{61^{2}}{4} - 5780$$

$$= 5830 - 5780 = 50$$

$$SST = 12^{2} + 17^{2} + 15^{2} + 18^{2} + \dots + 12^{2} + 14^{2}$$

$$= 6072 - 5780$$

$$= 292$$

$$SSE = 2ST - SSC - 518$$

$$= 292 - 57 \cdot 2 - 50 \cdot 1$$

$$= 292 - 57 \cdot 2 - 50 \cdot 1$$

$$= 184.8$$

source on	Dof	22	5832-26 SSW	(1 4 13)
Colomn	4-1=3	40 57.2	57.2 = 19.06	19.06 2 1.237
Row	5-1 = H	20	50 12 12.511	12.5 = 0.812 15.4
ध्याञ	12	3240184.8	12	
evior	19 12.	392	£ (22) 4. (EN) 4. (E	71) - 422

· Fc < Fo. 05 (3,4) = 2535 - 253136

· Fc < Foros (20,12) .

Accept Ho = 128 85 - 1 25 + 128 + 113 + 115 = ,722

11 12887 - 51 105 E

121,2916

22 25 30 - TH . . . + 9 + 501+ 5 PI+ 611 = T22

75.5831 -8848 :

HH FHA

3 way classification, Latin square design of set of analysis of variance for the following taxiance swell of significance of a datin square design use 0.01 level of significance

	Δ.,	10	10	8	149	中多十	
-	c	B	D	P	413		18.25
A SALES OF SALES	18	D 10	4	21	58		42.69
Agency and and a second	D 12	4	27	17	413 58 63	1 27	4 3 8
1	64	48	48	53	213		

Ho: There is no significant difference blu means of rows, columns and treatments

A B C D
$$947 - 5100$$
.

12 10 19 48

7 12 18 6 N = 16.

5 22 21 $10^{12} - 32 = 72$

7 $17 - 37 - 12$

85 36 348^{3}

$$CF = \frac{(013)^2}{16} = 2835.56224$$

$$SSC = \frac{(61)^2}{4} + \frac{(148)^2}{4} + \frac{(148)^2}{4} + \frac{(53)^2}{4} - 2835.56$$

10

1位侧

$$SST$$
, $2(31)^{2} + 61^{2} + 85^{2} + 36^{2} - 2835.56$
= $3300.75 - 2835.56$

85E = 85T - SSC - SSR - SSTr (217) 1.07 667.44 - 42.67 - 60.19 - 465-19 79.37 (111) = 155 mean sim or Dof 22 M 42.69 765.64 Columns 3 1FC = 14.23 = 1.07 60.19 $\frac{60.19}{3} = 20.06$ Fr = $\frac{20.06}{13.22} = 1.51$ 3 ROW 465.19301 165.19 = 155.06 30151 Treatment ELLOA 6.(n+)(n-2) 79.37 79.37 = 13.23 Total 15 647.44 62151 - 1111 + 1111 + 1111 + 311 + 3191 Fo.01 (3,6) = 4.76 Table Fc < Fo.01 (3,6) -> Accept Ho value 21-8.1PH 21 Fp < Fo.01 (3,6) - Accept H. 3,698 For > Fo. 61 (3, 6) - Reject to. There is no significance difference mobile means of nows and columns and there is significant difference blu means of theatment. 5x5 latin Square or the numbers of minutes, engines e, e, e, e, e, e, toned up by muchanics M,, M2, M3, of the figures in the following My, Ms san with a galon of feel A, B, C, D & E 322 113 Do Anonova lest to check if any 8.10-95.6-361.8-362.8 . Ey E, E3 127 Significana difference ble engines, A Μ, 20 20 24 mechanics, galone of fuel 25 31 M2 27 23 21 A D 123 M3 1.20 16=1-3 212 29 25 27 126 2.15 1 16 = 1-2 22 25 33 25 A 37 126 Ms 75 362.8 24 24 20 115 140 125 123 112 101962 301 C. B A N = 25 18 WIST 20 20 24 31 150 25 23 27 21 31 and management 25 276 25 July - (EL.7) 21 100 1133 u25 22 . . . 217,000 3,7,24, 24 20 MA 216/115 115 11H HI > February - (cr. H) 10 = F

111

$$CR = \frac{(c15)^2}{35} = 15129$$

$$CSC = \frac{(115)^2}{5} + \frac{140^2}{5} + \frac{125^2}{5} + \frac{123^2}{5} + \frac{113^2}{5} - 15129$$

$$CSSR = \frac{(113)^4}{5} + \frac{(127)^4}{5} + \frac{123^2}{5} + \frac{126^2}{5} + \frac{113^2}{5} - 15129$$

$$CSSR = \frac{(113)^4}{5} + \frac{(127)^4}{5} + \frac{123^2}{5} + \frac{126^2}{5} + \frac{113^4}{5} - 15129$$

$$CSST_7 = \frac{161^4}{5} + \frac{115^2}{5} + \frac{114^2}{5} + \frac{111^4}{5} + \frac{1114^2}{5} - 15129$$

$$CSST_8 = \frac{161^4}{5} + \frac{115^2}{5} + \frac{114^2}{5} + \frac{111^4}{5} + \frac{1114^2}{5} - 15129$$

$$CSST_8 = \frac{161^4}{5} + \frac{115^2}{5} + \frac{114^2}{5} + \frac{111^4}{5} + \frac{1114^2}{5} + \frac{1114^2}$$

Fr > Fo.01 (4,12) -> Right to

FR < Fo.01 (4,12) -> Accept to

Fr > Fo.01 (4,12) -> Right to

for engines, no significance de fference in mechanics, then is significance in full significance in full