Analysis of 2^3 factorial design:

The sum of squares due to any factorial effect, main or intersection is obtained on multiplying the squares of the factorial effects total by 1 divided by $8.r$, where r is the common replication number. Thus for example,

Sum of squares due to main effect $A = \frac{3^2}{8.r}$, 1 df

Sum of squares due to interaction effect $BC = \frac{3^2}{8.r}$, 1 d.f

and so on.

These sum of squares are calculated from yate's table.

Yate's table for calculating treatment sum of squares:

Treatment Combination	Treatment Total	[1]	[2]	[3]	$S.S = \frac{[3]^2}{2^3 \cdot r}$
1	[1] = ①	①+② = ⑨	⑨+⑩ = ⑰	⑰+⑱ = ㉕	–
A	[A] = ②	③+④ = ⑩	⑪+⑫ = ⑱	⑲+⑳ = ㉖	$(26)^2/8.r$
B	[B] = ③	⑤+⑥ = ⑪	⑬+⑭ = ⑲	㉑+㉒ = ㉗	$(27)^2/8.r$
AB	[AB] = ④	⑦+⑧ = ⑫	⑮+⑯ = ⑳	㉓+㉔ = ㉘	$(28)^2/8.r$
C	[C] = ⑤	②−① = ⑬	⑩−⑨ = ㉑	⑱+⑰ = ㉙	$(29)^2/8.r$
AC	[AC] = ⑥	④−③ = ⑭	⑫−⑪ = ㉒	⑳+⑲ = ㉚	$(30)^2/8.r$
BC	[BC] = ⑦	⑥−⑤ = ⑮	⑭−⑬ = ㉓	㉒−㉑ = ㉛	$(31)^2/8.r$
ABC	[ABC] = ⑧	⑧−⑦ = ⑯	⑯−⑮ = ㉔	㉔−㉓ = ㉜	$(32)^2/8.r$

ANOVA Table:

S.V	d.f	S.S	M.S.S	F-R	F-T
Blocks (replication)	$(r-1)$	R.S.S	$a = \frac{R.S.S}{r-1}$	a/i	$F_{r-1,(r-1)(t-1)}$ df
Treatments					
A	1	$S.S_A$	$b = \frac{S.S_A}{1}$	b/i	$F_{1,(r-1)(t-1)}$df
B	1	$S.S_B$	$c = S.S_B/1$	c/i	"
AB	1	$S.S_{AB}$	$d = S.S_{AB}/1$	d/i	"
C	1	$S.S_C$	$e = S.S_C/1$	e/i	"
AC	1	$S.S_{AC}$	$f = S.S_{AC}/1$	f/i	"
BC	1	$S.S_{BC}$	$g = S.S_{BC}/1$	g/i	"
ABC	1	$S.S_{ABC}$	$h = S.S_{ABC}/1$	h/i	"
Error	$(r-1)(t-1)$	S.S.E	$i = \frac{S.S.E}{(r-1)(t-1)}$		
Total	$(n-1)$	T.S.S			

Inference:

If the calculated value is less than the table value, null hypothesis is accepted. Otherwise it is rejected.