Ανάλυση Διασποράς με δύο παράγοντες

(μία παρατήρηση ανά συνδυασμό αγωγών)

> blend_rep(paste("Blend",1:5),4)

> treatment_rep(LETTERS[1:4],rep(5,4))

> yield_scan()

1: 89 84 81 87 79

6: 88 77 87 92 81

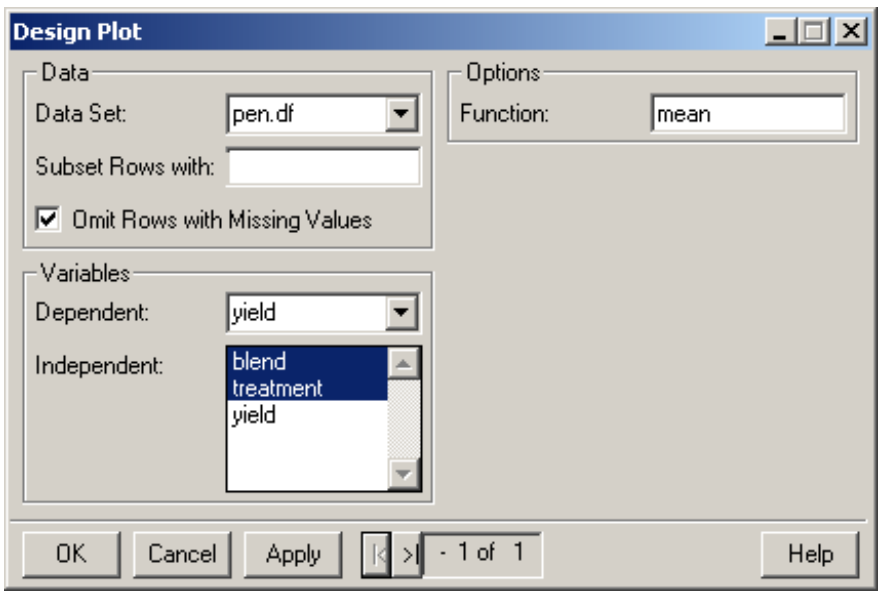
11: 97 92 87 89 80

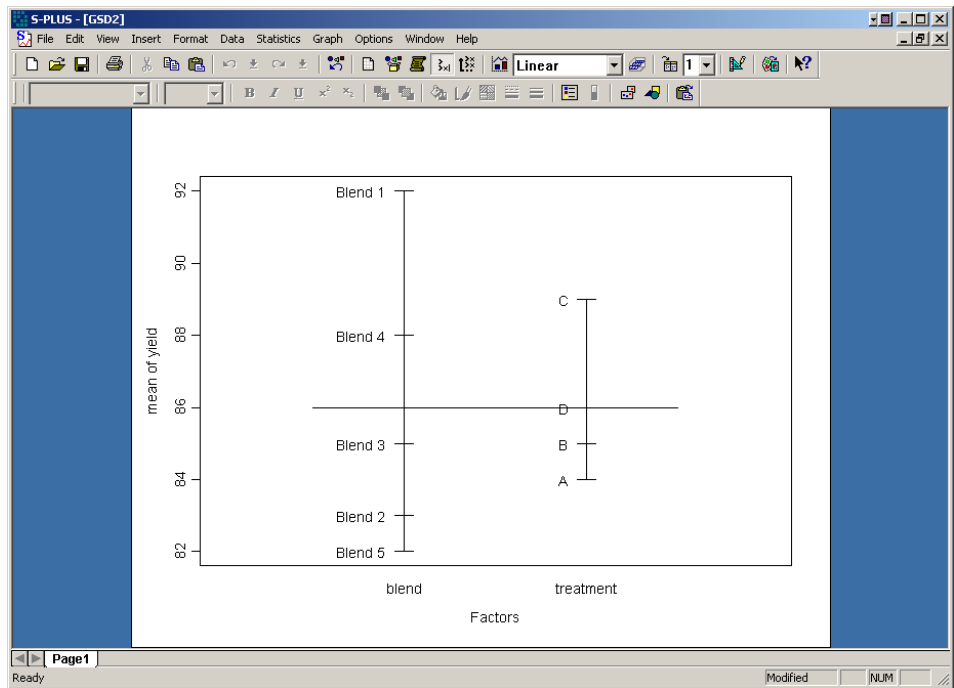
16: 94 79 85 84 88

21:

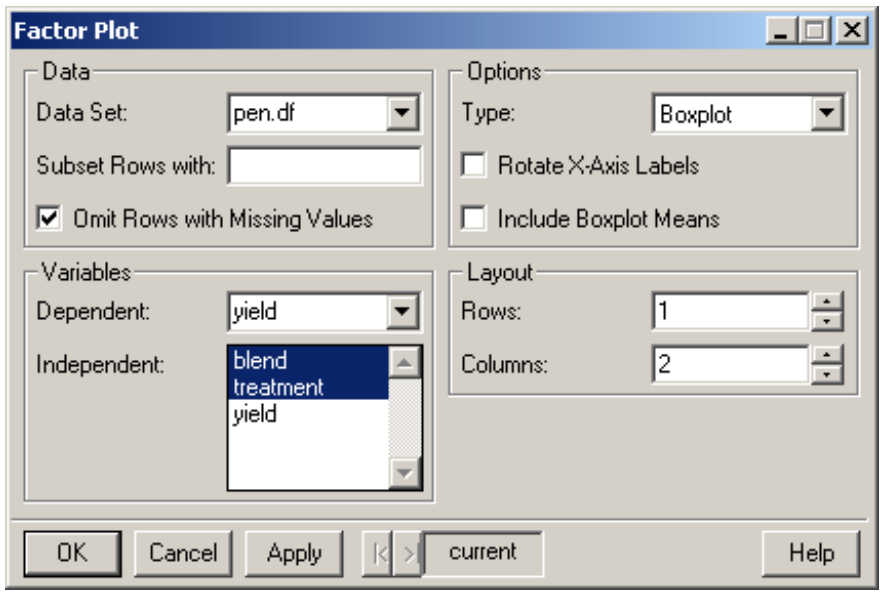
> pen.df_data.frame(blend,treatment,yield)

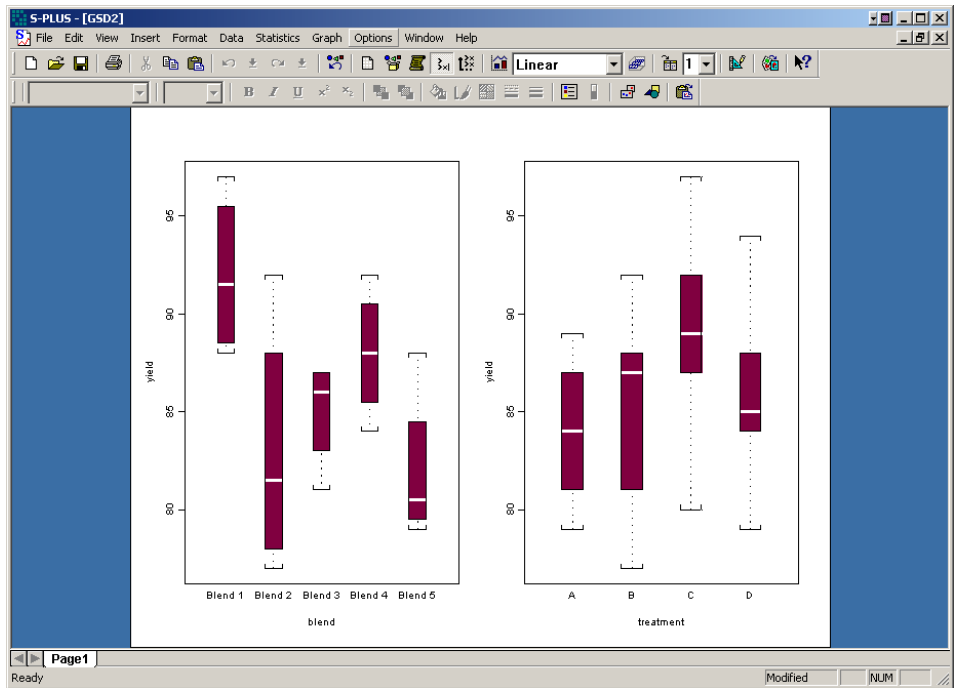
> plot.design(pen.df,fun=median)



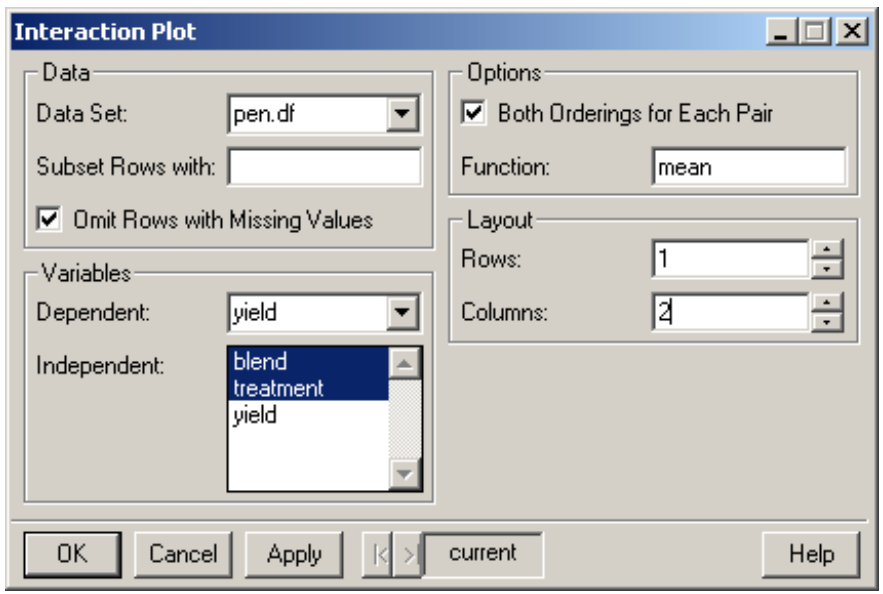


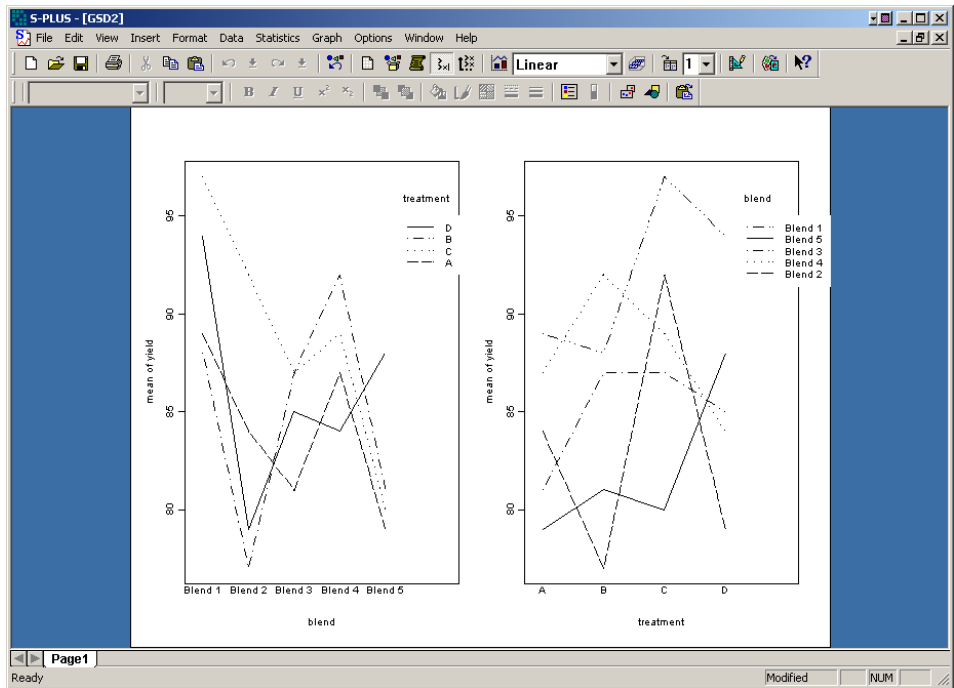
```
> par(mfrow=c(1,2))
> plot.factor(pen.df)
```



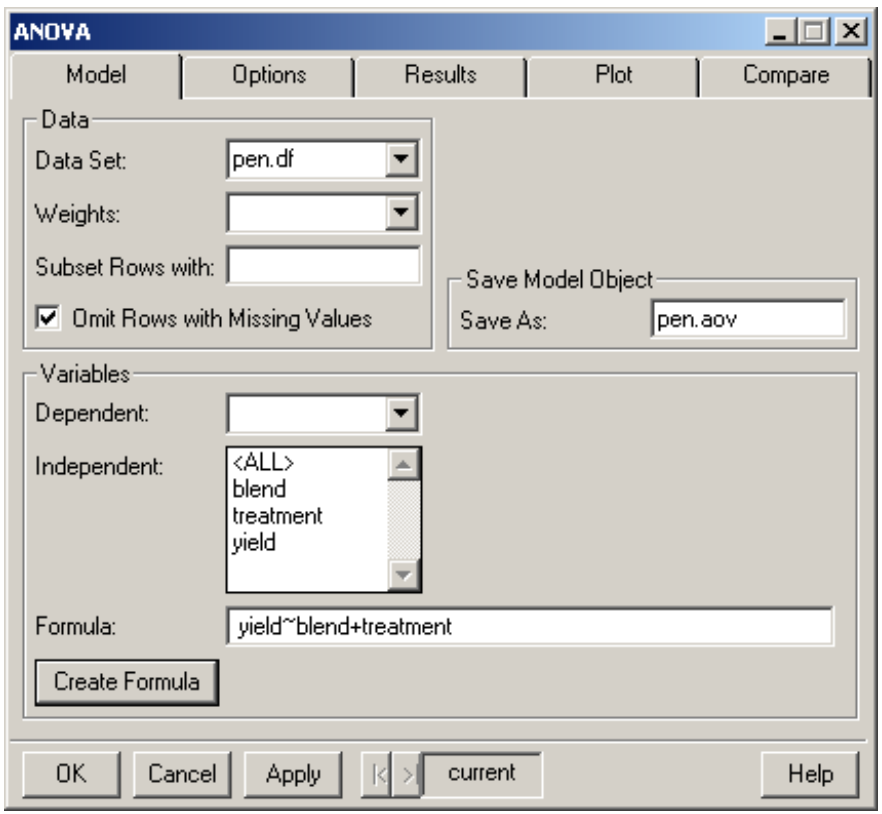


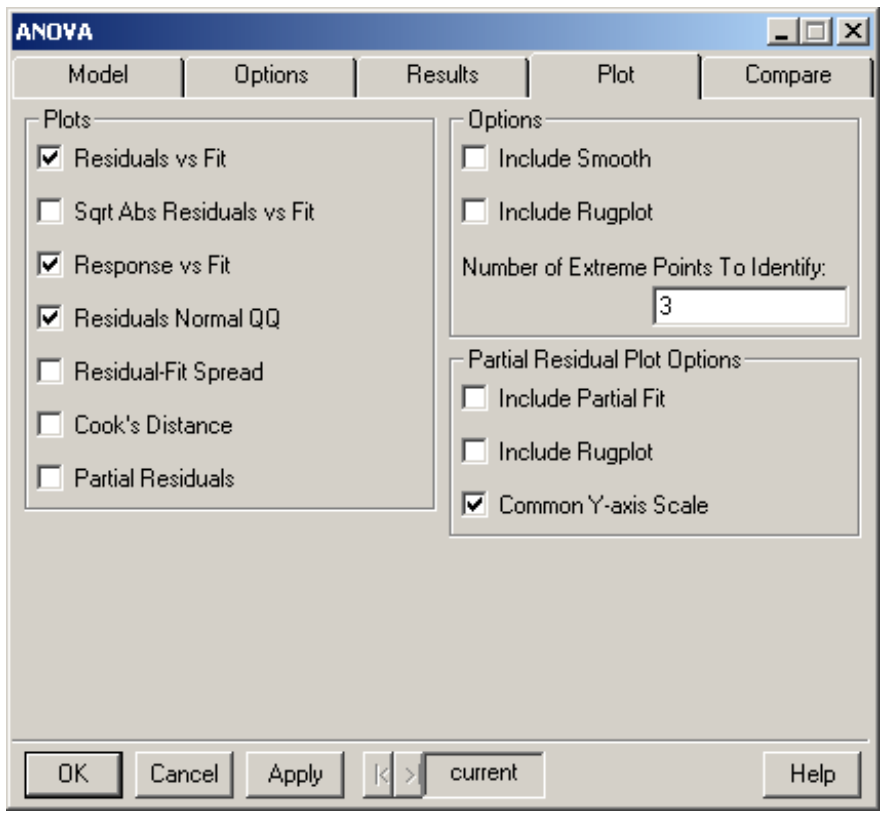
```
> attach(pen.df)
> interaction.plot(treatment, blend, yield)
> interaction.plot(blend, treatment, yield)
> detach()
```



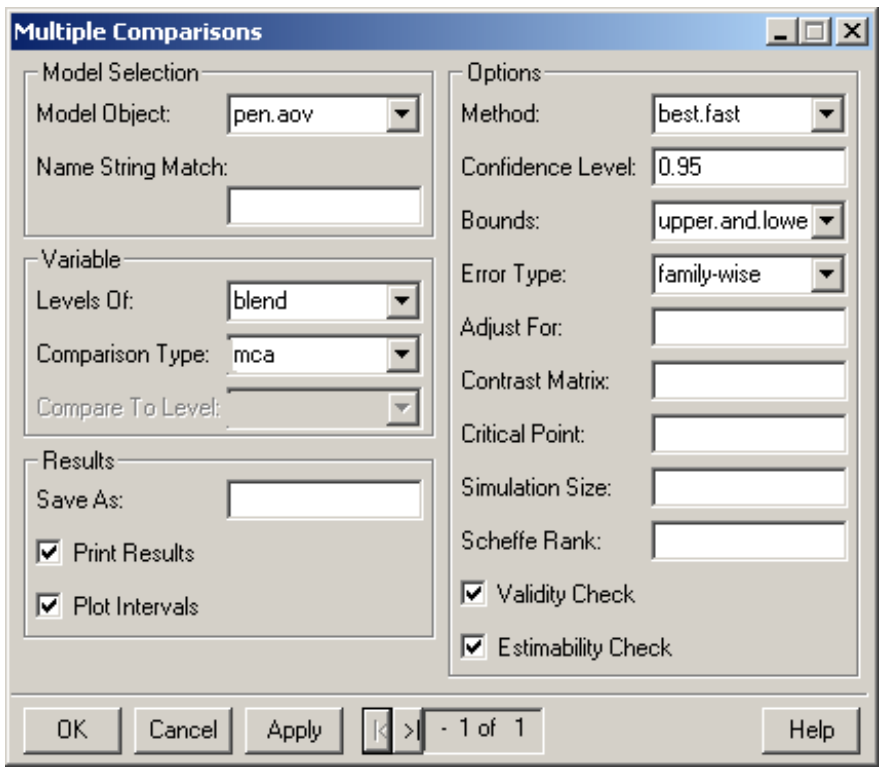


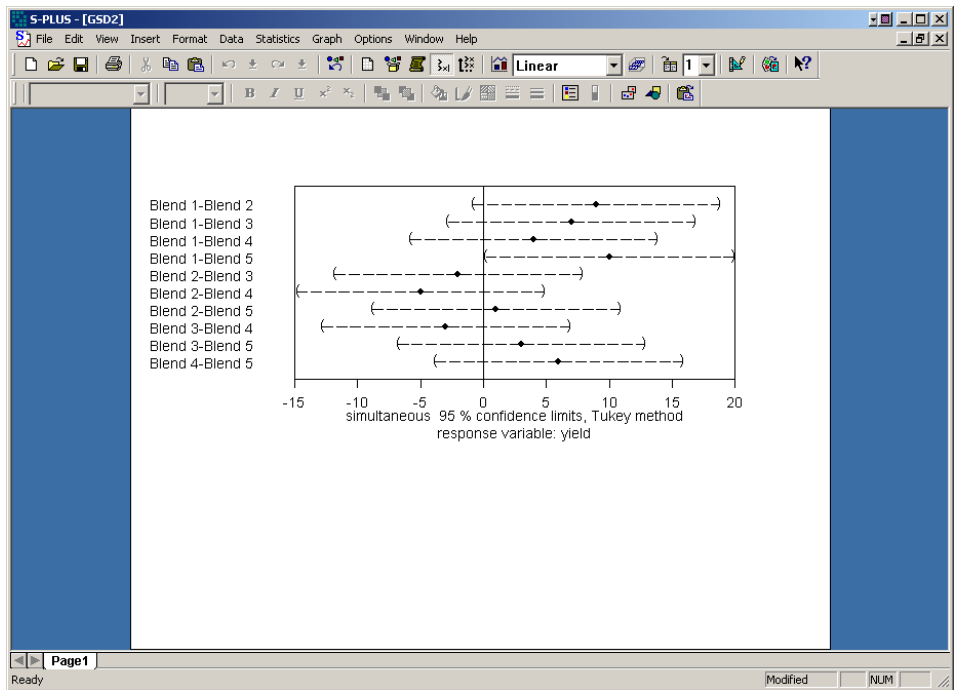
```
> pen.aov_aov(yield~blend+treatment,pen.df)
> qqnorm(resid(pen.aov))
> plot(fitted(pen.aov),resid(pen.aov))
```





```
> summary(pen.aov)
             Df Sum of Sq  Mean Sq  F Value     Pr(F)
    blend     4       264 66.00000 3.504425 0.0407462
treatment     3        70 23.33333 1.238938 0.3386581
Residuals    12       226 18.83333
```





> tukey.1(pen.aov,pen.df)

$p.value:

[1] 0.7597822

> comp.plot(pen.aov,pen.df)

$theta.hat:

[1] 4.002165

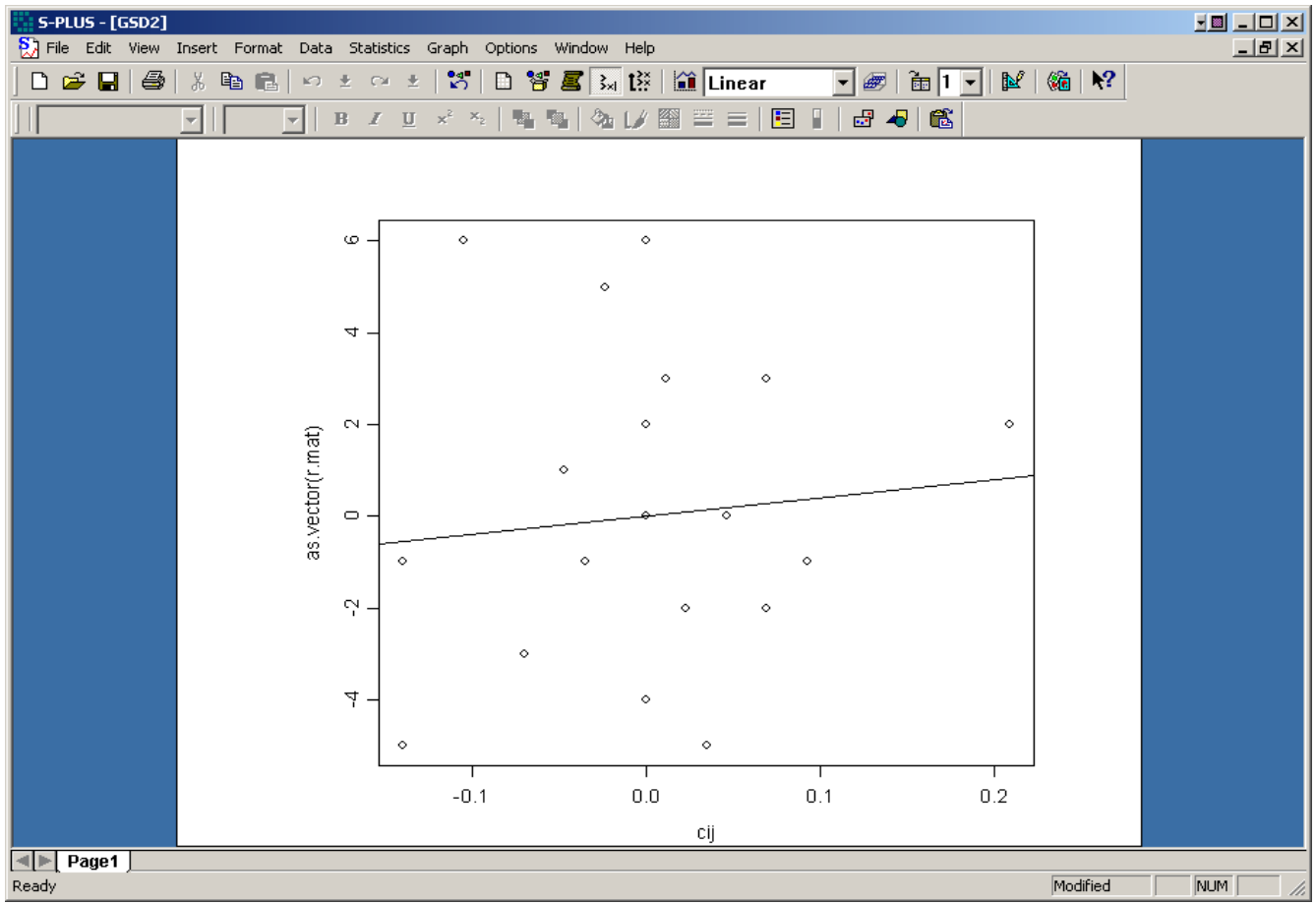
$std.error:

[1] 9.980428

$R.squared:

R2

0.008854346



$$y_{ij} = u + a_i + b_j + \Theta a_i b_j + e_{ij}$$

$$T_{1df} = (IJ - I - J)\frac{SS_\theta}{SS_{res.1}}$$

$$SS_\theta = \frac{\left(\sum_{i=1}^{I}\sum_{j=1}^{J} \hat{\alpha}_i^A \hat{\alpha}_j^B y_{ij}\right)^2}{\sum_{i=1}^{I}(\hat{\alpha}_i^A)^2 \sum_{j=1}^{J}(\hat{\alpha}_j^B)^2}$$

$$SS_{res.1} = SS_{res} - SS_\theta$$

$$SS_{res} = \sum_{i=1}^{I}\sum_{j=1}^{J} r_{ij}^2$$

$$Y_{ij} = \mu + t_i + e_{ij}$$

	df	EMS
Αγωγές	p - 1	$\rho^2_e + n\,\varpi^2_t$
Σφάλμα	p(n-1)	ρ^2_e

- Υπόθεση: H_0: $t_j = 0$ (για όλα τα j)

t_j τυχαίο δείγμα από $N(0,\rho^2_t)$

	df	EMS
Αγωγές	p - 1	$\rho^2_e + n\,\rho^2_t$
Σφάλμα	p(n-1)	ρ^2_e

- Υπόθεση: H_0: $\rho^2_t = 0$

> is.random(pen.df$blend)_T

> is.random(pen.df)

blend treatment

T F

> pen.vc_varcomp(yield~blend,pen.df)

> summary(pen.vc)

```
Call:
varcomp(formula = yield ~ blend, data = pen.df)
Variance Estimates:
          Variance
    blend 11.56667
Residuals 19.73333
Method:  minque0

Coefficients:
 (Intercept)
          86
Approximate Covariance Matrix of Coefficients:
[1] 3.3
>
```

$$Y_{ijk} = \mu + a_i + b_j + (ab)_{ij} + e_{ijk}$$