

Chapter 7(Eighth Edition): 7.1, 7.2, 7.13, 7.24, 7.25

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7.1

Consider the experiment described in Problem 6.1. Analyze this experiment assuming that each replicate represents a block of a single production shift.

```
# defining coded
coded=function(x) #a function to code variable x
{
  ifelse(x=="+", 1, -1)
}

# creating data table
factorA = rep(c("-", "+", "-", "+", "-", "+", "-"), times = 3)
factorB = rep(c("-", "-", "+", "+", "-", "-", "+", "+"), times = 3)
factorC = rep(c("-", "-", "-", "-", "+", "+", "+", "+"), times = 3)
Rep = rep(c("I", "II", "III"), each = 8)
yield = c(22,32,35,55,44,40,60,39,31,43,34,47,45,37,50,41,25,29,50,46,38,36,54,47)

#dataframe
cutting.speed.long = data.frame(factorA, factorB, factorC, Rep, yield)

cutting.aov = aov(yield~Rep+factorA*factorB*factorC, cutting.speed.long)
summary(cutting.aov)
```

```
##                Df Sum Sq Mean Sq F value    Pr(>F)
## Rep              2    0.6      0.3   0.008 0.991571
## factorA          1    0.7      0.7   0.019 0.891320
## factorB          1 770.7    770.7  22.381 0.000322 ***
## factorC          1 280.2    280.2   8.136 0.012789 *
## factorA:factorB   1   16.7     16.7   0.484 0.497998
## factorA:factorC   1  468.2    468.2  13.596 0.002438 **
## factorB:factorC   1   48.2     48.2   1.399 0.256623
## factorA:factorB:factorC 1   28.2     28.2   0.818 0.381072
## Residuals       14  482.1     34.4
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

7.2

Consider the experiment described in Problem 6.5. Analyze this experiment assuming that each one of the four replicates represents a block.

7.13

Using the data from the 2^4 design in Problem 6.22, construct and analyze a design in two blocks with ABCD confounded with blocks.

7.24

Suppose that in Problem 6.1 we had confounded ABC in replicate I, AB in replicate II, and BC in replicate III. Calculate the factor effect estimates. Construct the analysis of variance table.

7.25

Repeat the analysis of Problem 6.1 assuming that ABC was confounded with blocks in each replicate.