Biometry. Lecture 18

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April 9, 2014

Outline

1. [Questions and answers](#)

2. [Two-dimensional statistics](#)
   - [Analysis of covariation](#)

Starting...

> setwd("<working folder>")
                or
           "Change dir"
            in menu!

Previous final question: the answer

What is ANCOVA?

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What is ANCOVA?

- Analysis which checks if regression lines are different

Two-dimensional statistics
Analysis of covariation

ANCOVA model output

```
> ipo <- read.table(
+ "http://ashipunov.info/data/ipomopsis.txt", h=T)
> ipo.lm <- lm(Fruit ~ Root * Grazing, data=ipo)
> summary(ipo.lm)
```

Two equations:
Fruit = -125.174 + 23.24 * Root (for grazed)
Fruit = (-125.174 + 30.806) + (23.24 + 0.756) * Root
(for ungrazed)

ANCOVA model tuning

```
> ipo.lm2 <- update(ipo.lm, ~ . - Root:Grazing)
> summary(ipo.lm2)
> AIC(ipo.lm)
> AIC(ipo.lm2)
```

AIC stands for "Akaike Information Criterion"

Analysis of covariation, example II

Islands of two types: islet-like and stone-like

```
> it <- read.table("http://ashipunov.info/data/it.txt",
+ h=T, sep="\t")
> str(it)
> it$SQ <- log10(it$SQ)
> plot(SP ~ SQ, data=it, type="n")
> text(it$SQ, it$SP, labels=abbreviate(it$TYPE, 1))
> abline(lm(SP ~ SQ, data=subset(it, TYPE=="islet-like")))
> abline(lm(SP ~ SQ, data=subset(it, TYPE=="stone-like")),
+ lty=2)
```

Analysis of covariation, example II

```
> it.ancova <- lm(SP ~ SQ * TYPE, data=it)
> summary(it.ancova)
> it.ancova2 <- update(it.ancova, ~ . - SQ:TYPE)
> summary(it.ancova2)
> AIC(it.ancova)
> AIC(it.ancova2) # better!
> summary(lm(SP ~ SQ + TYPE, data=it)) # like second
```

Interceptions are different but slopes are the same. In statistical language, we may say that in this case, additive model is better. Square and type are two independent terms.

Summary: most important commands

- `lm()` —estimates the linear regression model and many other models (like ANCOVA)

For Further Reading

A. Shipunov.
Biometry [Electronic resource].
2012—onwards.
Mode of access:
http://ashipunov.info/shipunov/school/biol_240

A. Shipunov, and others.
Visual statistics. Use R!
DMK Press, 2012. [Under translation from Russian.]