Experimental Software Engineering (ESE)

Basic Principia.

A Descriptive view.

Credits

D. C. Montgomery, *Design and Analysis of Experiments*, McGraw-Hill.

Basic Principia.

Statistical planning of experiments

- Replication
- Randomization
- Blocking
- Balancing

Basic Principia. Statistical planning of experiments.

Replication

Objective

Obtaining variance as small as due.

Solution

$$\sigma_y^2=\sigma^2/n$$

Variance decreases inversely to the size of replication.

Replicating is not the same than repeating measures.

Basic Principia. Statistical planning of experiments.

Randomization

Objective

Randomizing errors, averaging on effects of foreign factors.

Solution

Define randomly:

- The *experimental objects*
- The order of assigning the *experimental subjects* to experimental objects and *treatments* (and whatever else)

Basic Principia. Statistical planning of experiments.

Blocking

Objective

Improve precision by reducing the impact of predictable [measurable] noises.

Solution

Use homogeneous experimental conditions (i.e. one block) for each factor of noise.

Basic Principia. Statistical planning of experiments.

Balancing

A balanced experiment is an experiment involving multiple groups or populations, in which the experiment includes equal numbers of units or individuals from each group.
This experimental design is simpler to manage than a design in which group representations are different, as findings must be adjusted for the differences in representation.

http://www.businessdictionary.com/definition/balanced-experiment.html