

Real-world vs simulation experiments: broad generalisations

Real world

Simulation

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Not many factors

Many factors

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Not many factors

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Not many levels

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Real-world vs simulation experiments: broad generalisations

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Not many factors

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More qualitative factors

Simulation

Many factors

Many levels

More quantitative factors

Real-world vs simulation experiments: broad generalisations

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Not many levels

More qualitative factors

ANOVA, ANCOVA

Simulation

Many factors

Many levels

More quantitative factors

Response surface methodology
(polynomial regression)

Real-world vs simulation experiments: broad generalisations

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Not many factors

Not many levels

More qualitative factors

ANOVA, ANCOVA

Limit to 2-factor interactions

Simulation

Many factors

Many levels

More quantitative factors

Response surface methodology
(polynomial regression)

Limit to 2nd-order polynomials

Real-world vs simulation experiments: broad generalisations

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Not many levels

More qualitative factors

ANOVA, ANCOVA

Limit to 2-factor interactions

Variance homogeneity tested

Simulation

Many factors

Many levels

More quantitative factors

Response surface methodology
(polynomial regression)

Limit to 2nd-order polynomials

Variance heterogeneity pervasive

Real-world vs simulation experiments: broad generalisations

Real world

Not many factors

Not many levels

More qualitative factors

ANOVA, ANCOVA

Limit to 2-factor interactions

Variance homogeneity tested

Visualising results useful

Simulation

Many factors

Many levels

More quantitative factors

Response surface methodology
(polynomial regression)

Limit to 2nd-order polynomials

Variance heterogeneity pervasive

Visualising results challenging

Real-world vs simulation experiments

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Randomisation important

Randomisation unimportant

Real-world vs simulation experiments

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Randomisation important

Blocking important

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Randomisation unimportant

Blocking unimportant

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Randomisation important

Blocking important

Replication important

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Randomisation unimportant

Blocking unimportant

Replication not a problem

Real-world vs simulation experiments

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Randomisation important

Blocking important

Replication important

Design efficiency important

Simulation

Randomisation unimportant

Blocking unimportant

Replication not a problem

Design efficiency not always important

Real-world vs simulation experiments

Real world

Randomisation important

Blocking important

Replication important

Design efficiency important

Single step

Simulation

Randomisation unimportant

Blocking unimportant

Replication not a problem

Design efficiency not always important

Multiple steps

Real-world vs simulation experiments

Real world

Randomisation important

Blocking important

Replication important

Design efficiency important

Single step

Screening not practical

Simulation

Randomisation unimportant

Blocking unimportant

Replication not a problem

Design efficiency not always important

Multiple steps

Screening useful

Real-world vs simulation experiments

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Randomisation important

Blocking important

Replication important

Design efficiency important

Single step

Screening not practical

Latin squares

Simulation

Randomisation unimportant

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Latin hypercubes