A versatile tool for simulation of linear model data

Raju Rimal, Trygve Almøy and Solve Sæbø

Faculty of Chemistry and Bioinformatics (KBM)

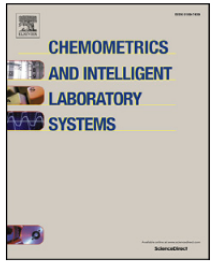
Norwegian University of Life Scienes (NMBU)

12 Mar, 2018

Contents lists available at ScienceDirect

Chemometrics and Intelligent Laboratory Systems

journal homepage: www.elsevier.com/locate/chemometrics



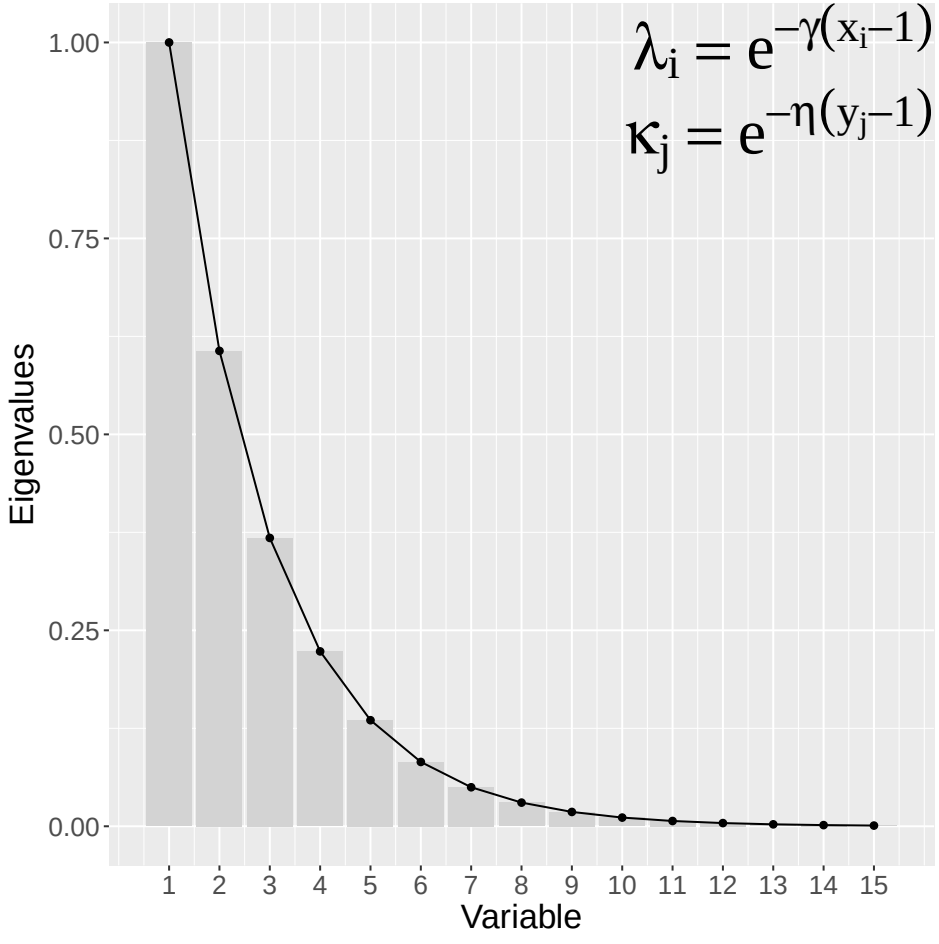
A tool for simulating multi-response linear model data

Raju Rimal [a,*], Trygve Almøy [a], Solve Sæbø [b]

[a] Faculty of Chemistry and Bioinformatics, Norwegian University of Life Sciences, Ås, Norway
[b] Prorector, Norwegian University of Life Sciences, Ås, Norway

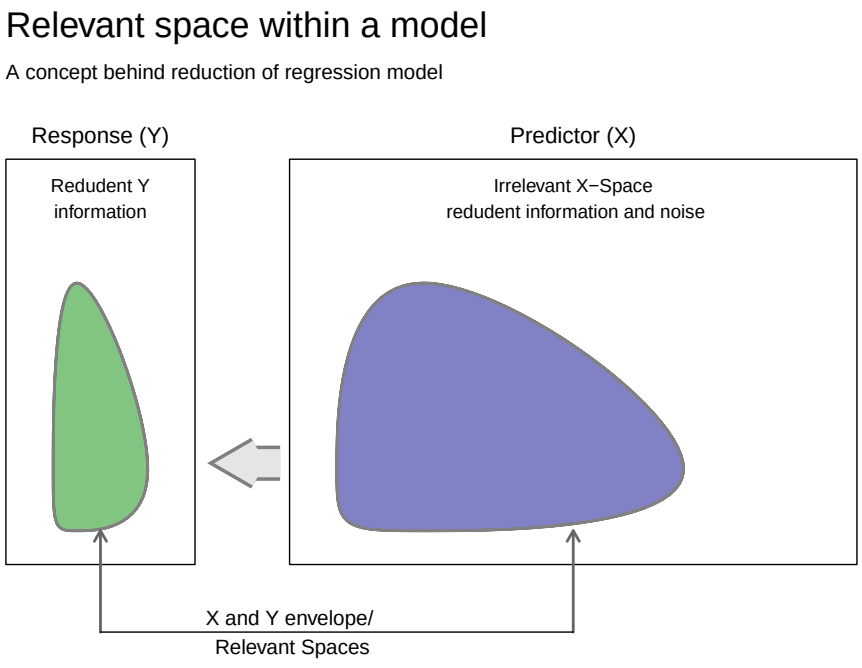
Why Simrel

- Simulated data is **used everywhere** in research to compare methods, models, algorithms, techniques etc. `Simrel` can be a common tool for such purpose
- Simulate *linear model* data with *wide range of properties* using **small set of tuning paramters**, Example:
  - Controlling *degree of multicollinearity* in the simulated data
  - Specifying the *relevant principle components* for prediction



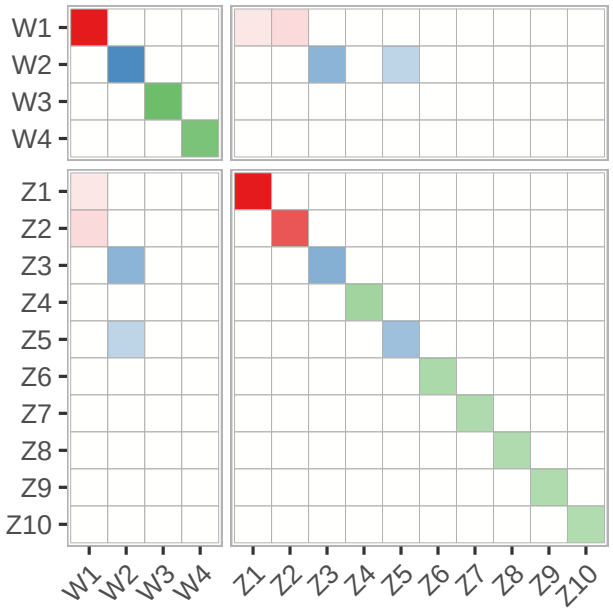
Idea Behind

Reduction of regression Model: A Predictor sub-space (blue) is relevant for informative response sub-space (green)

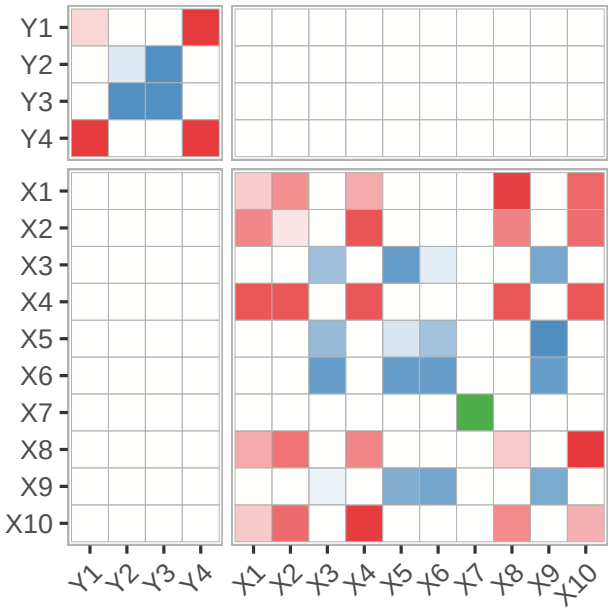


- A model defines its relationship with Response Space
- Subspace within these spaces (a reduced regression model) contains information for this relationship
- Set of orthogonal variables (Z) span the relevant predictor subspace (predictor components)
- Set of orthogonal variables (W) span the response subspace (response components)
- Implement this idea to construct the relevant covariance matrix and make simulation with it

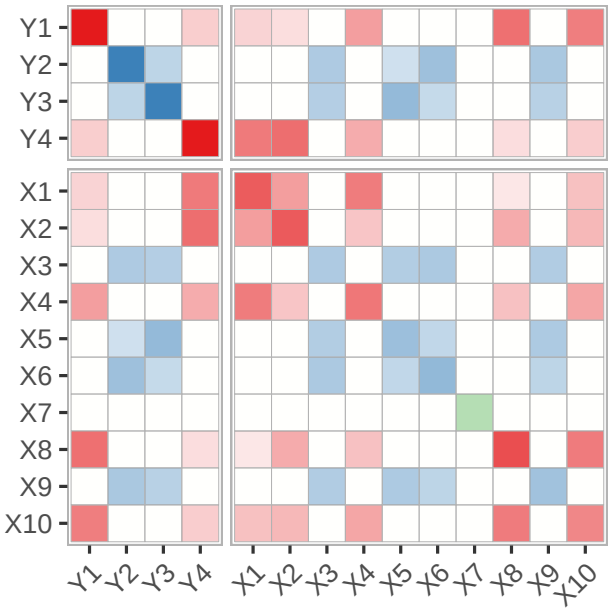
How it works



Relevant for: W1 W2 None

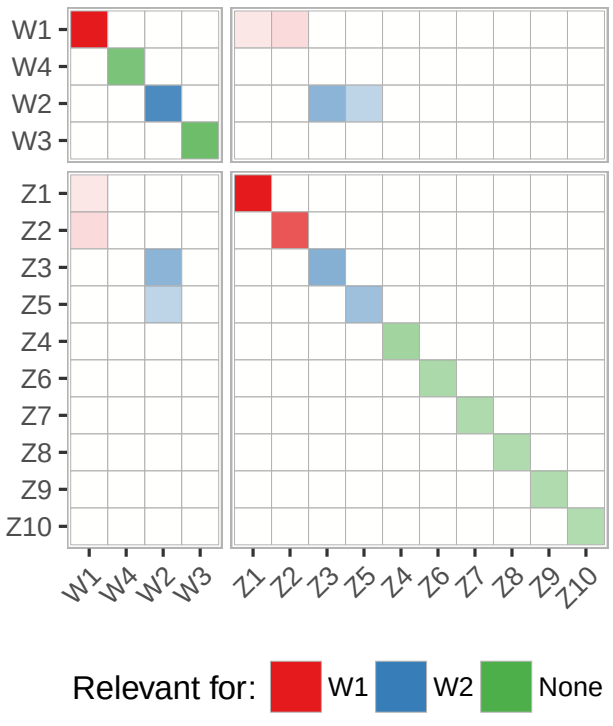


Y1 Y2 None

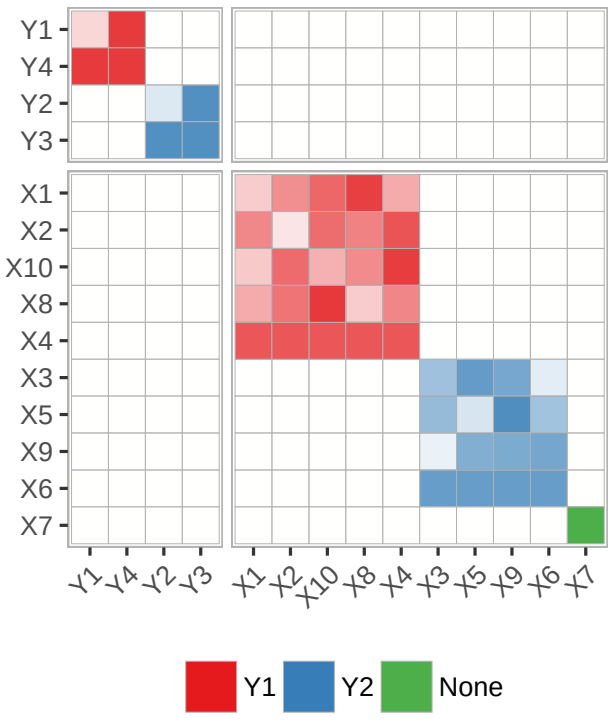


Relevant for: Y1 Y2 None

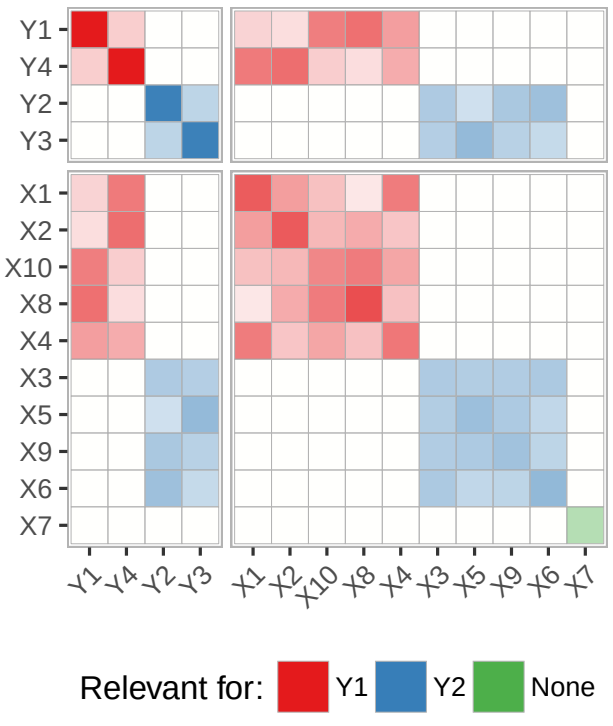
How it works



Relevant for: W1 W2 None



Y1 Y2 None



Relevant for: Y1 Y2 None

Where Simrel

Example Simrel

Acknoledgement

- Trygve
- Solve
- Franchisco
- Lars


Thank You
Salamat
Dakyjem
GRACIAS
ধন্যবাদ
TAKK
ASANTE
TAK
Teşekkür ederim
SUWUN
hvala
Salamat
HVALA
mersi
شكرا جزيلا
Ευχαριστώ
감사합니다
GRAZAS
kiitos
merci
GRAZZii
DANKE
Salamat
TAKK
MAHALO
Рахмет
kiitos
ARIGATO
arigato
takk
suwun
ধন্যবাদ
HVALA
GRAZIE
DAKUJEM
MERCi
Teşekkür ederim
kiitos
hvala
mahalo
GRACIAS
GRAZAS
TAKK
ありがとう
DANKE
Благодарам
gra2ie
TAKK
ASANTE
Salamat
SUWUN
多謝
SALAMAT
спасибо
gracias