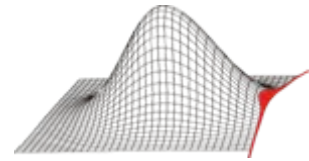


ProSi

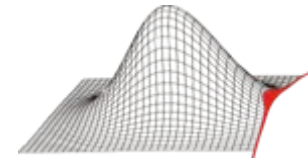
Probabilistisches Simulationstool

Matthias Voigt



Historische Entwicklung:

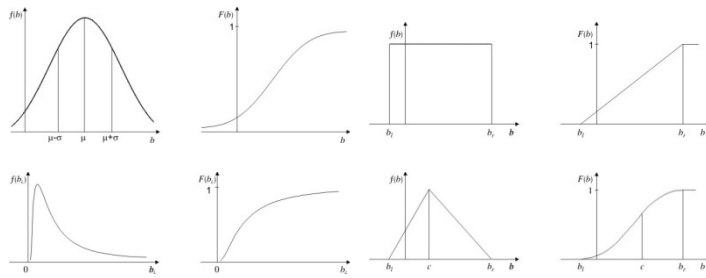
- 2002 erste Programmteile zur Auswertung von probabilistischen Ergebnissen
- 2003 erste Version von ProSi (RSM)
- 2005 ProSi 1.1 unterstützt MCS und RSM auf allen Unix, Linux Rechnern
- 2007 ProSi 2.0
- Geplant 2008 ProSi 2.1 Windows + Unix



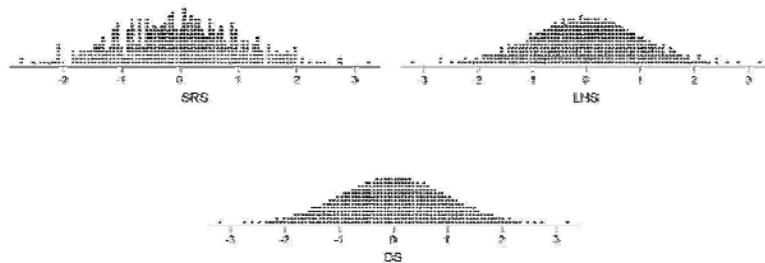
Probabilistische Methoden:

MCS

Verteilungen

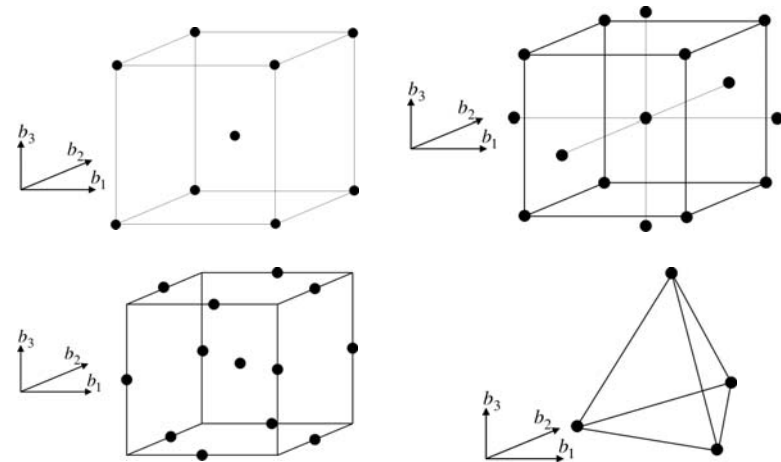


Samplingmethoden

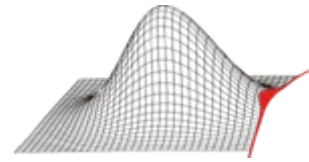


Korrelationseinstellung

RSM

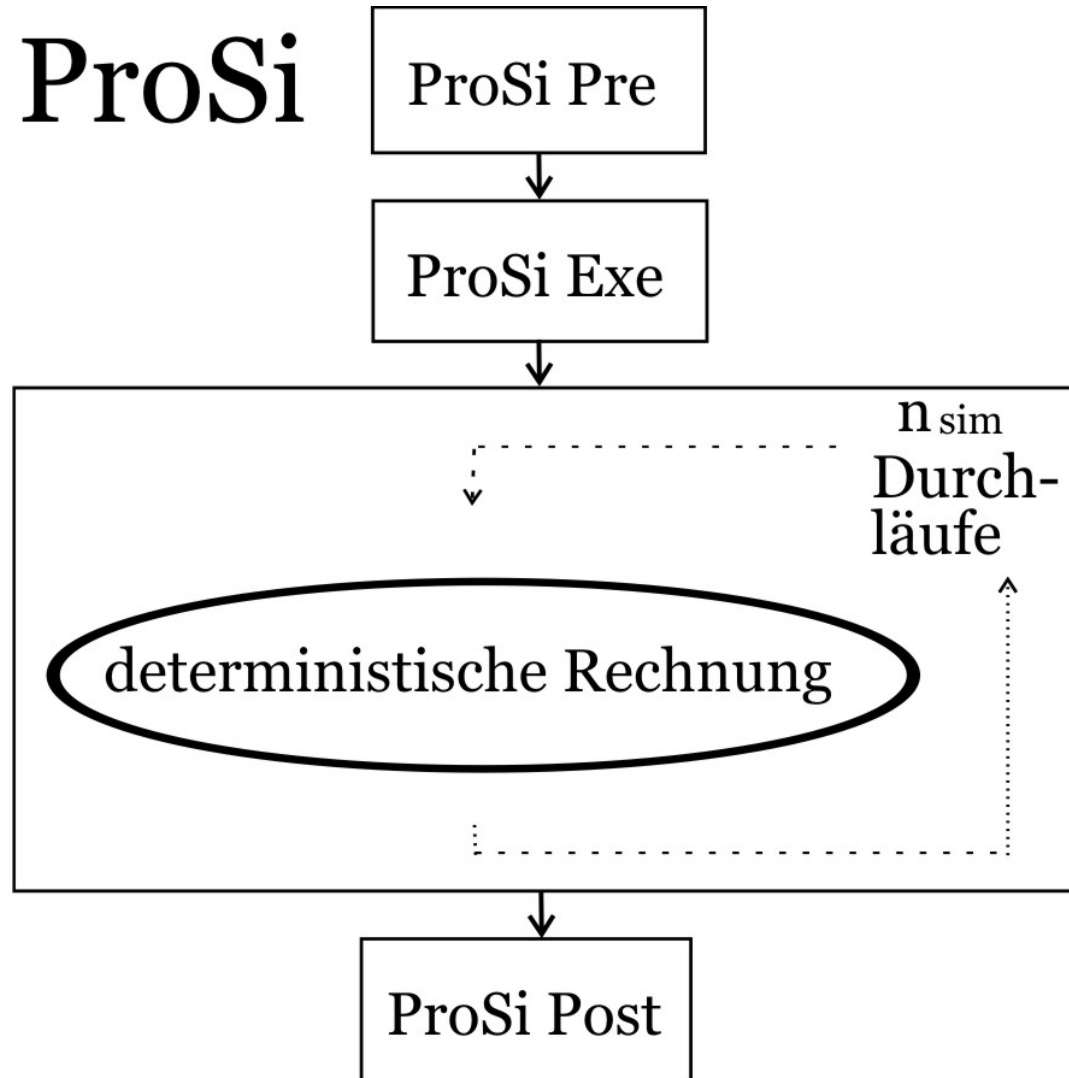
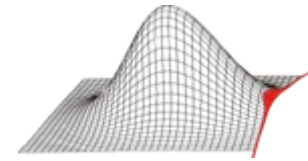


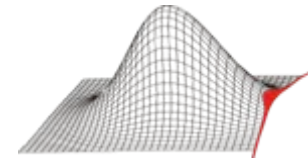
Box-Cox-Transformation
 Filtermethode



ProSi ermöglicht:

- Probabilistische Untersuchungen aller Systeme, die sich mit ASCII-Dateien steuern lassen
- Automatische parallele Berechnung der deterministischen Lösungen auf verschiedenen Computern
- Statistische Auswertung der Ergebnisse





prosi_pre <2>

Project

General Simulation Settings | Definitions of the Probabilistic Model | Dependent Variables | Result Values

Name of Simulation:

Directory of the Deterministic Model:

Directory for the generated Det. Data Sets:

Directory for ProSi Log and Output Files:

Method:

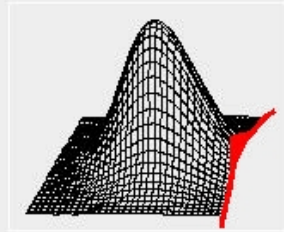
Shots: Interval: 1 - 1000000

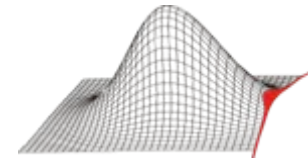
Sampling:

Experimental_design:

Power: Interval: 1 - 3

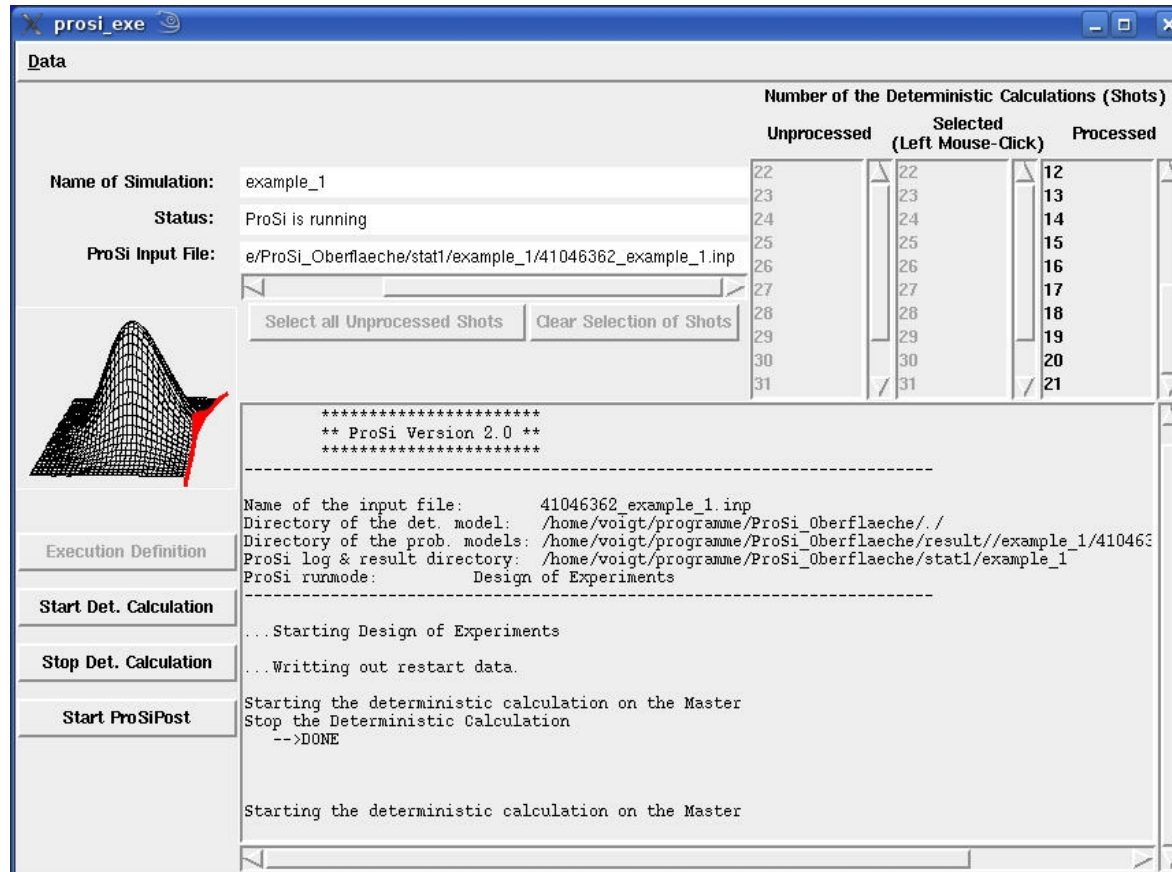
Improvement:





Durchführen der deterministischen Rechnungen:

- Definition der Rechner (Linux-Cluster)
- Steuerbar über eine graphische Oberfläche



Data

Name of Simulation: example_1
 Status: ProSi is running
 ProSi Input File: e:/ProSi_Oberflaeche/stat1/example_1/41046362_example_1.inp

| | Number of the Deterministic Calculations (Shots) | | |
|----|--------------------------------------------------|--------------------------------|-----------|
| | Unprocessed | Selected (Left Mouse-Click) | Processed |
| 22 | 22 | 12 | |
| 23 | 23 | 13 | |
| 24 | 24 | 14 | |
| 25 | 25 | 15 | |
| 26 | 26 | 16 | |
| 27 | 27 | 17 | |
| 28 | 28 | 18 | |
| 29 | 29 | 19 | |
| 30 | 30 | 20 | |
| 31 | 31 | 21 | |

Select all Unprocessed Shots Clear Selection of Shots

```

*****
** ProSi Version 2.0 **
*****

Name of the input file:      41046362_example_1.inp
Directory of the det. model: /home/voigt/programme/ProSi_Oberflaeche/.
Directory of the prob. models: /home/voigt/programme/ProSi_Oberflaeche/result/example_1/410463
ProSi log & result directory: /home/voigt/programme/ProSi_Oberflaeche/stat1/example_1
ProSi runmode:              Design of Experiments

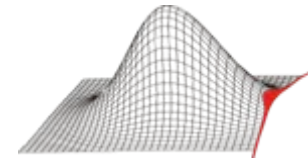
... Starting Design of Experiments

... Writing out restart data.

Starting the deterministic calculation on the Master
Stop the Deterministic Calculation
-->DONE

Starting the deterministic calculation on the Master
  
```

Execution Definition
 Start Det. Calculation
 Stop Det. Calculation
 Start ProSiPost

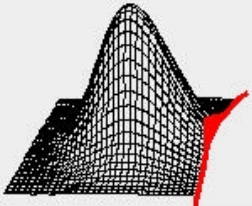


Postprozessing:

- Statistische Auswertung
- Reduzierung des Zeitaufwandes
- Verhindern von Auswertungsfehlern

prosi_post <2>

Data



| SHOT-NR | NL14_flow_rate | NL13_flow_rate | NL09_flow_rate | LE05_flow_rate | LE24_flow_r |
|---------|----------------|----------------|----------------|----------------|-------------|
| 477 | 0.69374 | 0.65724 | 1.5504 | 1.1967 | 0.6 |
| 478 | 0.72105 | 0.68567 | 1.6287 | 1.2567 | 0.73 |
| 479 | 0.46129 | 0.43918 | 1.0613 | 0.82094 | 0.42 |
| 480 | 0.73177 | 0.70085 | 1.6783 | 1.2941 | 0.80 |
| 481 | 0.68707 | 0.65218 | 1.5514 | 1.1975 | 0.67 |
| 482 | 0.55504 | 0.52781 | 1.2427 | 0.96083 | 0.57 |
| 483 | 0.49783 | 0.47402 | 1.1158 | 0.8634 | 0.50 |
| 484 | 0.74953 | 0.71845 | 1.7208 | 1.326 | 0.77 |
| 485 | 0.62633 | 0.59964 | 1.4603 | 1.1269 | 0.60 |
| 486 | 0.65272 | 0.61722 | 1.4673 | 1.1323 | 0.66 |
| 487 | 0.76475 | 0.73074 | 1.6991 | 1.3097 | 0.77 |
| 488 | 0.76944 | 0.72718 | 1.6388 | 1.2643 | 0.70 |
| 489 | 0.64071 | 0.60776 | 1.4078 | 1.0868 | 0.58 |
| 490 | 0.73416 | 0.70034 | 1.6461 | 1.2698 | 0.77 |
| 491 | 0.69775 | 0.66078 | 1.5205 | 1.1735 | 0.69 |
| 492 | 0.51237 | 0.48423 | 1.1289 | 0.87361 | 0.54 |
| 493 | 0.52136 | 0.49114 | 1.1268 | 0.87196 | 0.54 |
| 494 | 0.61453 | 0.58691 | 1.3666 | 1.0554 | 0.60 |
| 495 | 0.57913 | 0.54893 | 1.3363 | 1.0323 | 0.58 |
| 496 | 0.61265 | 0.58225 | 1.376 | 1.0626 | 0.60 |
| 497 | 0.79504 | 0.75515 | 1.7534 | 1.3506 | 0.79 |
| 498 | 0.58783 | 0.55761 | 1.3306 | 1.0279 | 0.58 |
| 499 | 0.61874 | 0.59055 | 1.4248 | 1.0999 | 0.63 |
| 500 | 0.64144 | 0.6153 | 1.4663 | 1.1315 | 0.65 |
| 501 | 0.70491 | 0.66225 | 1.5451 | 1.1926 | 0.72 |
| 502 | 0.65222 | 0.62049 | 1.4885 | 1.1488 | 0.71 |
| 503 | 0.58962 | 0.56621 | 1.3634 | 1.0529 | 0.64 |
| 504 | 0.58962 | 0.56621 | 1.3634 | 1.0529 | 0.64 |

VALUES

BASIC STATISTIC

CUMULATIVE DENSITY

HISTOGRAM

2D-ANT-HILL-PLOT

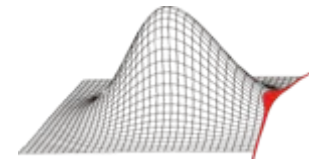
3D-ANT-HILL-PLOT

PIE-CHART

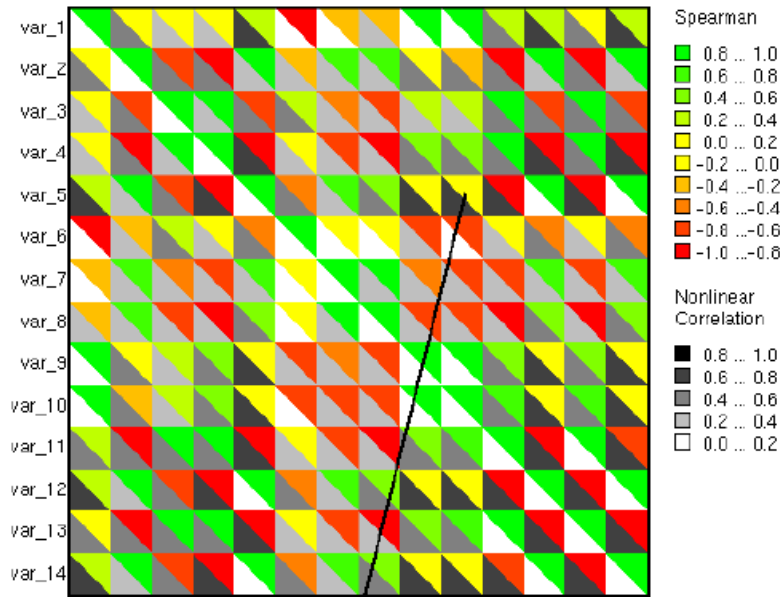
CORRELATION-MATRIX

RESPONSE-SURFACE

REFRESH DATA



Korrelationsmatrix

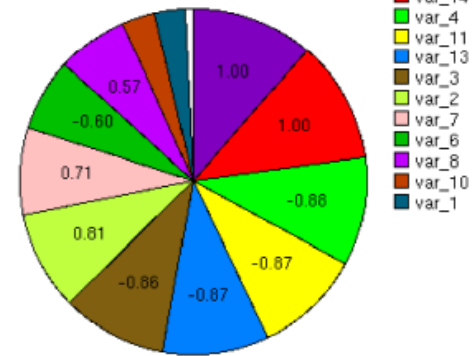


var_10 - var_5
Spearman Correlation: -0.17
Nonlinear Correlation: 0.66

Print ps-file Print gif-file Return Close

Kreisdiagramm (Pearson)

Target-Variable: var_5



var_9

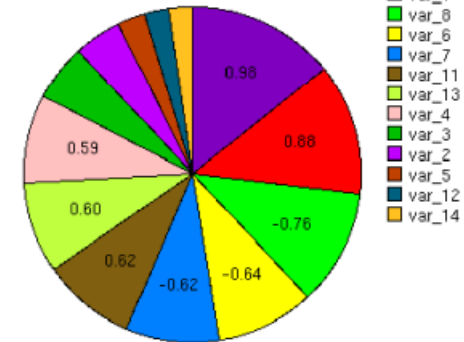
Print ps-file

Print gif-file

Close

Kreisdiagramm (Spearman)

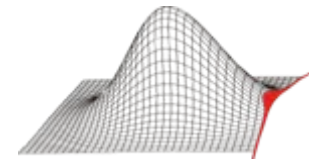
Target-Variable: var_10



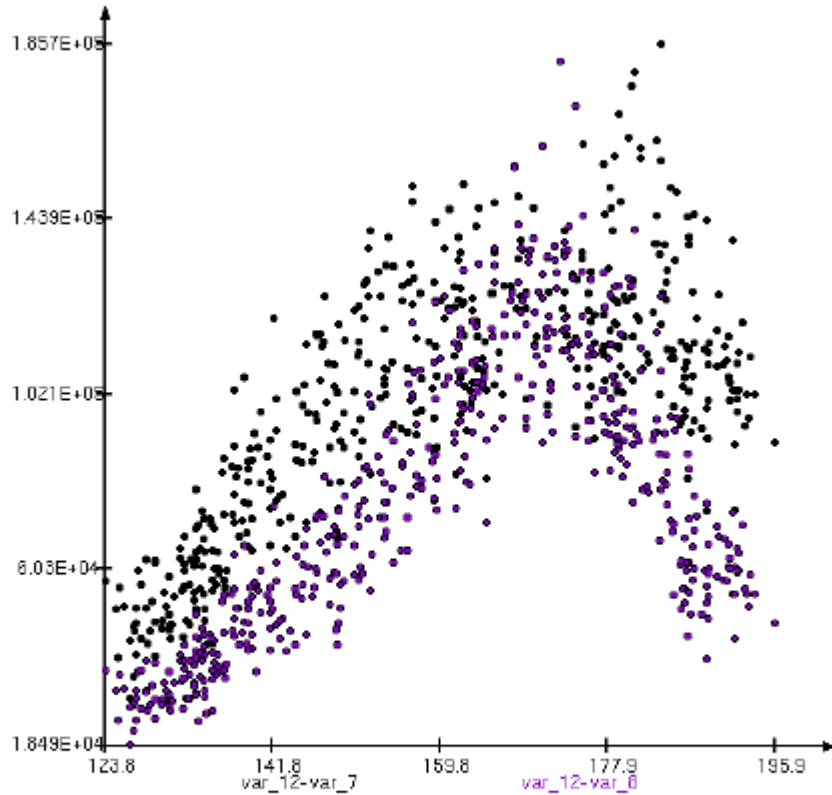
Print ps-file

Print gif-file

Close

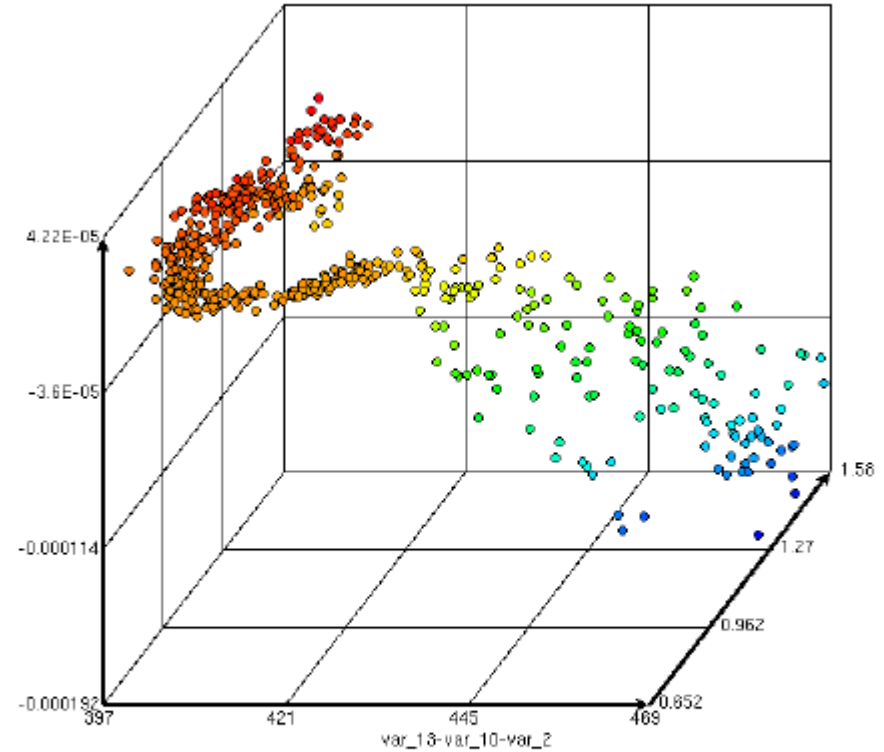


2D-Ant-Hill-Plot

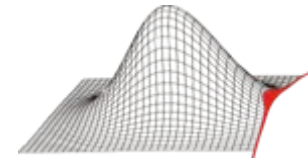


| | | | | | |
|---------------|-------|----------------|--------|-----------------|--------|
| x_min | x_max | y_min | y_max | Zoom | Return |
| 123.8 | 195.9 | 18489 | 185714 | | |
| Print ps-file | | Print gif-file | | Clear Selection | |
| Close | | | | | |

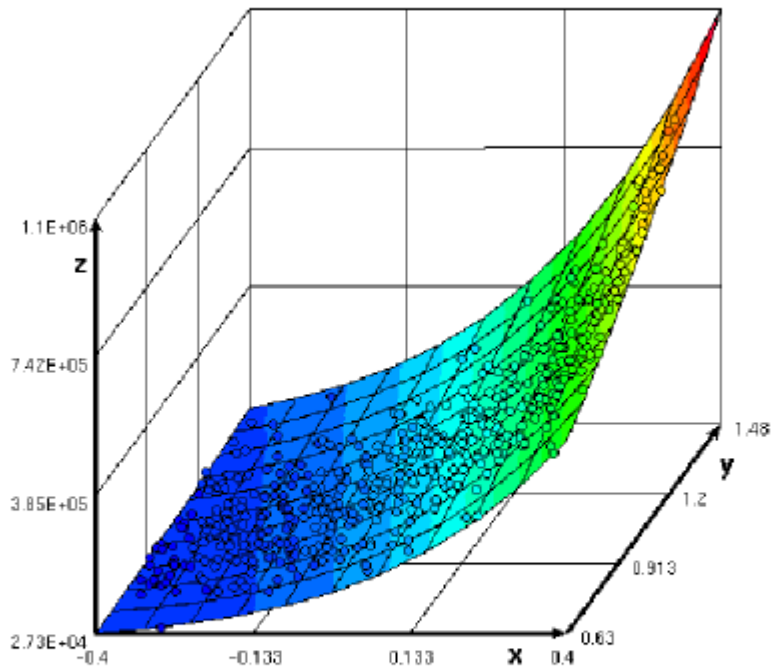
3D-Ant-Hill-Plot



| | | | | | |
|---------------|-------|----------------|-------------|-------------------------------|--------|
| | x | y | z | Zoom | Return |
| min | 398.6 | 0.85209 | -0.00019239 | | |
| max | 489.3 | 1.58258 | 4.2185e-5 | Change x and y axes variables | |
| Print ps-file | | Print gif-file | | Close | |



3D-Antwortflächen-Plot



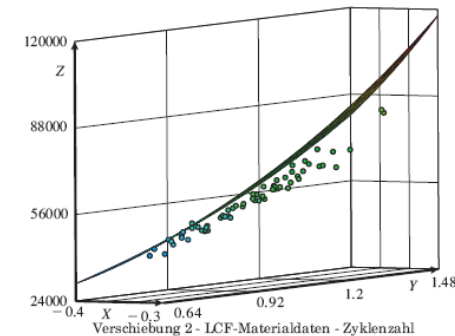
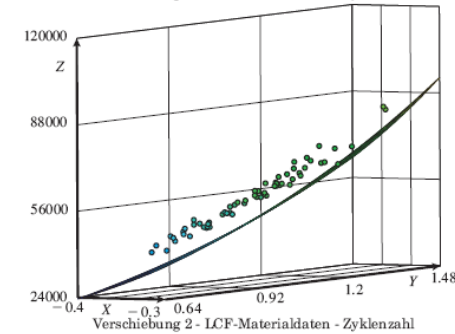
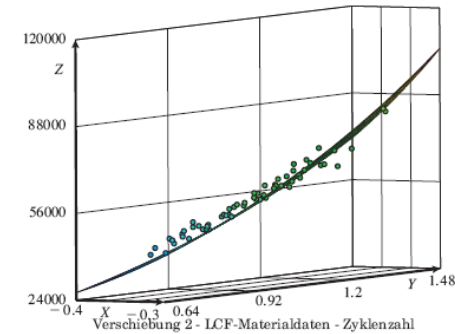
Verschiebung_2 - LCF-Materialdaten - Zyklenzahl

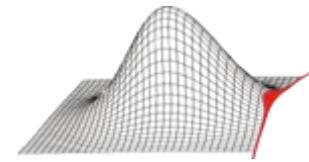
| | x | y | z | Zoom | Return |
|----------------------------|------|----------------|---------|-------|--------|
| min | -0.4 | 0.63 | 27300 | | |
| max | 0.4 | 1.48 | 1100000 | | |
| Change x and y axes values | | | | | |
| Print ps-file | | Print gif-file | | Close | |

| | |
|------------------|------|
| E_Modul | 1.00 |
| Zentrifugalkraft | 1.00 |
| Verschiebung_1 | 0.00 |

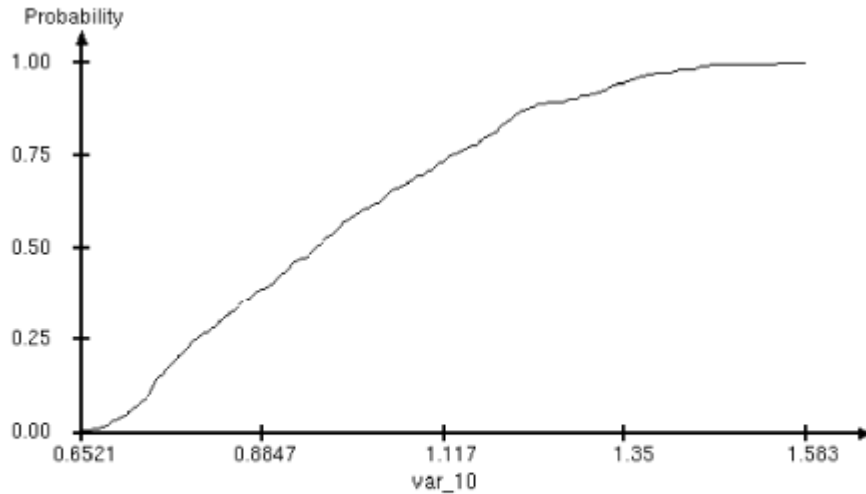
| | |
|------------------|------|
| E_Modul | 0.95 |
| Zentrifugalkraft | 1.01 |
| Verschiebung_1 | 0.04 |

| | |
|------------------|-------|
| E_Modul | 1.05 |
| Zentrifugalkraft | 0.99 |
| Verschiebung_1 | -0.04 |



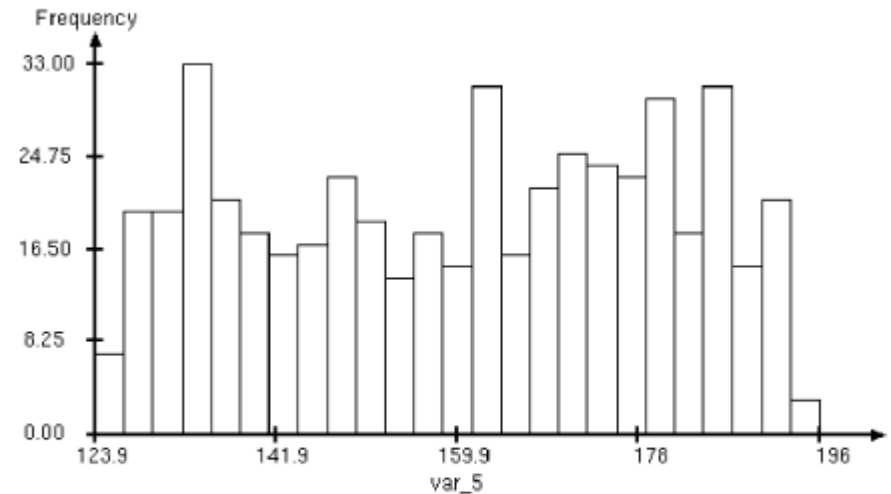


Verteilungsfunktion



[Print ps-file](#)
[Print gif-file](#)
[Close](#)

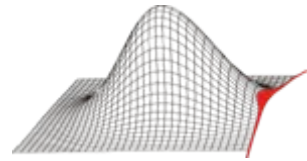
Histogramm



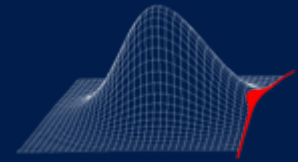
Number of Buckets

25

[Show Envelope](#)
[Print ps-file](#)
[Print gif-file](#)
[Close](#)



ProSi entstand innerhalb der AG Turbo Vorhaben
„Probabilistische mechanische Auslegung von Turbinen“
und
„Entwicklung und Umsetzung von effizienten
probabilistischen Methoden in der Auslegung von
Turbinenschaufeln“
mit finanzieller Unterstützung von
ALSTOM, MTU, Rolls-Royce Deutschland
und
Bundesministerium für Wirtschaft und Technologie



ProSi

Probabilistisches Simulationstool

Matthias Voigt