

The following is the input file web6.par. This example illustrates the use of alias names for the independent and dependent variables and the unknown parameters. There are two dependent variables (*growth* and *pressure*) and four unknowns. The single independent variable is *temperature*. Note the dependence of the variable *growth* upon the other dependent variable *pressure*. To enhance convergence, a lower limit was set on the unknown parameter *pressure_c2* and an upper limit was set on *growthcoeff*. Another interesting feature of this example is the use of the initial value of *pressure_c2* as a Bayesian estimator. This is achieved by setting an estimated sigma value on this initial value. The parameter section and the data records are included on this file. By default all the data points are weighted equally (i.e., unit weighing is used).

```
// a recursive example using aliases

independent temperature;
dependent growth, pressure;
unknown growthcoeff, pressure_c1, pressure_c2, p_c3;

growth = 'growthcoeff + pressure_c1 * pressure'
pressure = 'pressure_c2 * temperature ^ 1.5 + p_c3'

pressure_c1 = 2.4
pressure_c20 = 3          pressure_c2min = -10
pressure_c2sig = 0.5      ! Bayesian estimator
growthcoeff = 1.2        growthcoeffmax = 100

ncol=3  xcol=1  ycol1=2  ycol2=3;

// temperature  growth  pressure
      1.0      2.0      3.0
      1.1      2.2      3.7
      1.2      2.4      3.9
      1.3      2.7      4.8
      1.4      3.0      6.0
      1.5      3.5      9.0
```

The following is the output file web6.out. The information included on this file is also shown on the screen. To run this file the following command is issued from a DOS window:

regress web6

PARAMETERS USED IN REGRESS ANALYSIS: Thu Dec 22 12:59:09 2005

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INPUT PARMS FILE: web6.par
INPUT DATA FILE: web6.par
REGRESS VERSION: 4.11, Apr 4, 2005
```

```
STARTREC - First record used      :      1
N - Number of recs used to build model :      6
NO_DATA - Code for dependent variable  -999.0
NCOL - Number of data columns      :      3
```

NY - Number of dependent variables : 2
 YCOL1 - Column for dep var GROWTH : 2
 YCOL2 - Column for dep var PRESSURE : 3
 SYTYPE1 - Sigma type for GROWTH : 1
 TYPE 1: SIGMA GROWTH = 1
 SYTYPE2 - Sigma type for PRESSURE : 1
 TYPE 1: SIGMA PRESSURE = 1
 M - Number of independent variables : 1
 Column for TEMPERATURE : 1
 SXTYPE1 - Sigma type for TEMPERATURE : 0
 TYPE 0: SIGMA TEMPERATURE = 0

Analysis for Set 1

Function GROWTH: GROWTHCOEFF + PRESSURE_C1 * PRESSURE
 Function PRESSURE: PRESSURE_C2 * TEMPERATURE ^ 1.5 + P_C3

EPS - Convergence criterion : 0.00100
 CAF - Convergence acceleration factor : 1.000

| ITERATION | GROWTHCOEFF | PRESSURE_C1 | PRESSURE_C2 | P_C3 | S/(N.D.F.) |
|-----------|-------------|-------------|-------------|---------|------------|
| 0 | 1.20000 | 2.40000 | 3.00000 | 0.00000 | 9.19508 |
| 1 | -0.55475 | 0.27498 | 3.38430 | 0.30379 | 2.97543 |
| 2 | 0.01752 | 0.51628 | 3.38430 | 0.30379 | 0.94435 |

| REC | Y-INDEX | TEMPERATURE | GROWTH | SIGGROWTH | CALC_VALUE |
|-----|---------|-------------|---------|-----------|------------|
| 1 | 1 | 1.00000 | 2.00000 | 1.00000 | 1.92160 |
| 2 | 1 | 1.10000 | 2.20000 | 1.00000 | 2.19014 |
| 3 | 1 | 1.20000 | 2.40000 | 1.00000 | 2.47117 |
| 4 | 1 | 1.30000 | 2.70000 | 1.00000 | 2.76417 |
| 5 | 1 | 1.40000 | 3.00000 | 1.00000 | 3.06867 |
| 6 | 1 | 1.50000 | 3.50000 | 1.00000 | 3.38425 |

| REC | Y-INDEX | TEMPERATURE | PRESSURE | SIGPRESSURE | CALC_VALUE |
|-----|---------|-------------|----------|-------------|------------|
| 1 | 2 | 1.00000 | 3.00000 | 1.00000 | 3.68809 |
| 2 | 2 | 1.10000 | 3.70000 | 1.00000 | 4.20822 |
| 3 | 2 | 1.20000 | 3.90000 | 1.00000 | 4.75257 |
| 4 | 2 | 1.30000 | 4.80000 | 1.00000 | 5.32009 |
| 5 | 2 | 1.40000 | 6.00000 | 1.00000 | 5.90989 |
| 6 | 2 | 1.50000 | 9.00000 | 1.00000 | 6.52114 |

| PARAMETER | INIT_VALUE | SIG_BAYES | MINIMUM | MAXIMUM | VALUE | SIGMA |
|-------------|------------|-----------|----------|----------|---------|---------|
| GROWTHCOEFF | 1.20000 | Not Spec | Not Spec | 10000.00 | 0.01752 | 2.41324 |
| PRESSURE_C1 | 2.40000 | Not Spec | Not Spec | Not Spec | 0.51628 | 0.46633 |
| PRESSURE_C2 | 3.00000 | 0.50000 | -1000.00 | Not Spec | 3.38430 | 0.45855 |
| P_C3 | 0.00000 | Not Spec | Not Spec | Not Spec | 0.30379 | 0.75753 |

Variance Reduction: 82.43 (Average)
 VR: GROWTH 97.81
 VR: PRESSURE 67.04

S/(N+NBAYES-P) : 0.94435

RMS (Y - Ycalc) : 0.81217 (all data)
 RMS (Y1-Ycalc): 0.07477
 RMS (Y2-Ycalc): 1.14615