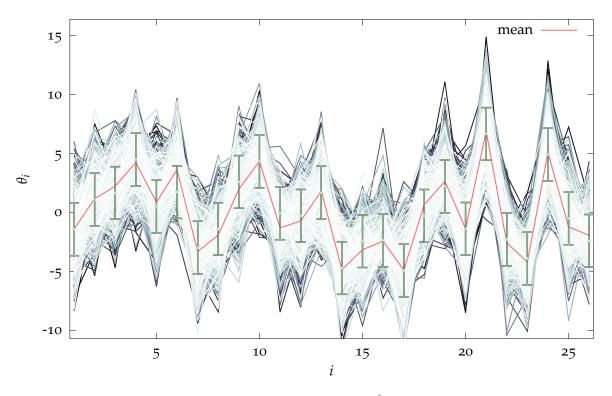
# MCMC\_CLIB

# Analysis of a large Sample

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# December 17, 2013



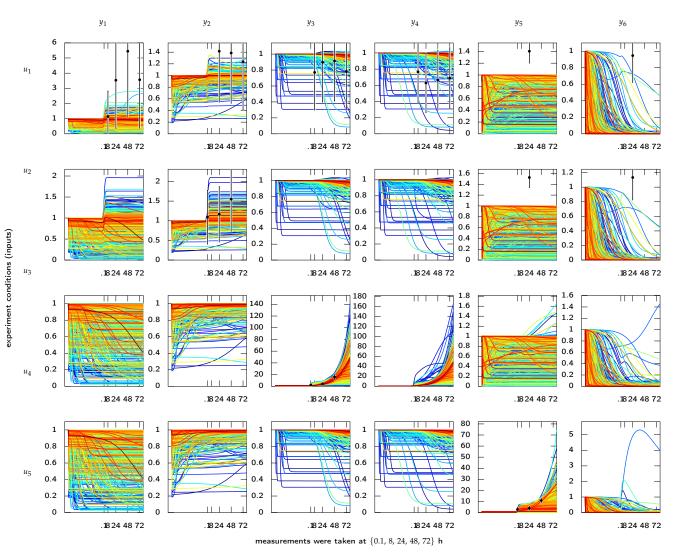
**Figure 1:** The Posterior Sample of size  $N=1\times 10^6$ , as obtained from the MCMC\_CLIB; thinned out using the integrated autocorrelation length  $\tau_{\text{int},l}=1516(250)$  (estimated using the log-posterior l as observable). The red line indicates the maximum posterior estimate, while the green errorbars indicate the used prior distribution (iid, Gaussian).

The sample was obtained in  $t_s = 267385 \,\mathrm{s}$ . Considering the auto-correlation, the

effective sampling speed is:

$$v = \frac{N}{2\tau_{\text{int.,}l}t_{\text{s}}} = 12(2) \times 10^{-4}\,\text{s}^{-1}\,.$$
 (1)

model outputs



**Figure 2:** output trajectories per parameter sample member; to reduce the number of lines these trajectory lines are once again plotted for every 3534th  $(2(\tau_{\text{int},l} + \delta_{\tau}))$  parameter in the parameter sample. The green, vertical errorbars represent the data and its measurement error estimation. The data is sparse (not all outputs were observed at all measurement instances. The model does not fit all data points.)

time t in h

```
tuning duration 1000 points target acceptance a_0 0.50 observed acceptance a 0.27 auto-correlation length \tau_{\text{int},,l} 1516(250) failed Likelihood evaluations [CVODES] 16
```

Table 1: Sample Properties.

#### Listing 1: Model

```
1 <? xml version="1.0" ?>
   <VectorField Name="ODEmodel11S26P4U" Description="Aumodeluforutestingupurposes">
   <Parameter Name="theta_1" DefaultValue="1.0"/>
   <Parameter Name="theta_2" DefaultValue="1.0"/>
   <Parameter Name="theta_3" DefaultValue="1.0"/>
6 < Parameter Name = "theta_4" Default Value = "1.0"/>
   <Parameter Name="theta_5" DefaultValue="1.0"/>
   <Parameter Name="theta_6" DefaultValue="1.0"/>
   <Parameter Name="theta_7" DefaultValue="1.0"/>
   <Parameter Name="theta_8" DefaultValue="1.0"/>
11 < Parameter Name = "theta_9" Default Value = "1.0"/>
   <Parameter Name="theta_10" DefaultValue="1.0"/>
   <Parameter Name="theta_11" DefaultValue="1.0"/>
   <Parameter Name="theta_12" DefaultValue="1.0"/>
   <Parameter Name="theta_13" DefaultValue="1.0"/>
16 < Parameter Name = "theta_14" DefaultValue = "1.0"/>
   <Parameter Name="theta_15" DefaultValue="1.0"/>
   <Parameter Name="theta_16" DefaultValue="1.0"/>
   <Parameter Name="theta_17" DefaultValue="1.0"/>
   <Parameter Name="theta_18" DefaultValue="1.0"/>
21 < Parameter Name = "theta_19" DefaultValue = "1.0"/>
   <Parameter Name="theta_20" DefaultValue="1.0"/>
   <Parameter Name="theta_21" DefaultValue="1.0"/>
   <Parameter Name="theta_22" DefaultValue="1.0"/>
   <Parameter Name="theta_23" DefaultValue="1.0"/>
26 < Parameter Name="theta_24" DefaultValue="1.0"/>
   <Parameter Name="theta_25" DefaultValue="1.0"/>
   <Parameter Name="theta_26" DefaultValue="1.0"/>
   <Parameter Name="u1" DefaultValue="0.0"/>
   <Parameter Name="u2" DefaultValue="0.0"/>
31 < Parameter Name = "u3" Default Value = "0.0"/>
   <Parameter Name="u4" DefaultValue="0.0"/>
   <Expression Name="logistic" Formula="1.0/(1+exp(-t))"/>
   <Expression Name="Ult" Formula="u1*logistic"/>
   <Expression Name="U2t" Formula="u2*logistic"/>
36 < Expression Name="U3t" Formula="u3*logistic"/>
   <Expression Name="U4t" Formula="u4*logistic"/>
   < Expression Name="S1" Formula="X4+X5"/>
   <Expression Name="S2" Formula="(theta_22)*X9*X7"/>
```

```
<Expression Name="A1" Formula="(theta_1)*X2"/>
41 < Expression Name = "A2" Formula = "(theta_2) * X1"/>
   <Expression Name="A3" Formula="(theta_3)*X3*X2"/>
   < Expression Name="A4" Formula="(theta_4)*X4"/>
   < Expression Name="A5" Formula="(theta_10)*X4"/>
   <Expression Name="A51" Formula="(theta_10)*X5"/>
46 < Expression Name = "A6" Formula = "(theta_13) * X7"/>
   <Expression Name="A7" Formula="(theta_14)*S1*X6"/>
   <Expression Name="A8" Formula="(theta_19)*X10*S1"/>
   <Expression Name="A9" Formula="(theta_20)*X8"/>
   <Expression Name="A10" Formula="(theta_22)*X11*X7"/>
51 < Expression Name="A11" Formula="(theta_21)*X9"/>
   < State Variable Name = "X1"
                    DefaultInitialCondition="1000.0"
                    Formula=^{1}A1 - A2 + (theta_5) * (0.1 + S2) - (theta_7) * X1'' />
   < State Variable Name = "X2"
56
                    DefaultInitialCondition="1000.0"
                    Formula="-A1+A2-(theta_8)*X2" />
   < State Variable Name = "X3"
                    DefaultInitialCondition="1000.0"
                    Formula="-A3+A4+(theta_6)+(theta_12)*U2t-(theta_9)*X3" />
61 < State Variable Name = "X4"
                    DefaultInitialCondition="1000.0"
                    Formula="A3-A4-A5" />
   < State Variable Name = "X5"
                    DefaultInitialCondition="0.0"
66
                    Formula="+(theta_11)*U1t-A51" />
   < State Variable Name = "X6"
                    DefaultInitialCondition="1000.0"
                    Formula = "A6 - A7 + (theta_15) + (theta_18) * U3t - (theta_16) * X6" />
   < State Variable Name = "X7"
71
                    DefaultInitialCondition="1000.0"
                    Formula="-A6+A7-(theta_17)*X7" />
   < State Variable Name = "X8"
                    DefaultInitialCondition="1000.0"
                    Formula="+A8-A9-(theta_24)*X8"/>
76 < State Variable Name = "X9"
                    DefaultInitialCondition="1000.0"
                    Formula = " + A9 - A11" />
   < State Variable Name = "X10"
                    DefaultInitialCondition="1000.0"
81
                    Formula="-A8+A10" />
   < State Variable Name = "X11"
                    DefaultInitialCondition="1000.0"
                    Formula="-A10+A11+(theta_23)+(theta_26)*U4t-(theta_25)*X11" />
   < Function Name = "Y1" Formula = "(X4+X5)"/>
86 \langle Function \text{ Name} = "Y2" \text{ Formula} = "(X3+X5)"/>
   < Function Name="Y3" Formula="(X7+X6)"/>
   <Function Name="Y4" Formula="(X6)"/>
```

```
<Function Name="Y5" Formula="(X10+X9+X11+X8)"/>
     <Function Name="Y6" Formula="X8"/>
91 //vectorField>
```