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// T14simExp.sce
// SIMULATION OF EXPONENTIAL MODEL  $f(y)=a*\exp(-a*y)$ 
// Experiments
// - change parameters of the model
// -----
exec("ScIntro.sce",-1), mode(0)

// PARAMETERS // 1
nd=1000; // 2
thS=[2 5]; // comp. expectations // 3
rS=[1 2]; // comp. variances // 4
alS=[.4 .6]; // pointer model parameters // 5
nc=length(thS); // number of components // 6
// 7
// INITIALIZATION // 8
ni=100; // strength of prior info. // 9
S=thS*ni; ka=ones(1,nc)*ni; // initial statistics // 10
thE=S./ka; // initial parametr // 11
tht=thE; // remember par. estimates // 12
// 13
// ESTIMATION // 14
for t=1:nd // 15
    c(t)=sum(cumsum(alS)<rand(1,1,'u'))+1; // pointer // 16

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y(t)=thS(c(t))+sqrt(rS(c(t)))*rand(1,1,'n');    // data           // 17
                                                    // 18
for j=1:nc                                       // 19
    q(j)=GaussN(y(t),thE(j),sqrt(rS(j)));        // proximity           // 20
end                                               // 21
                                                    // 22
w=q/sum(q);                                     // weights             // 23
wt(:,t)=w;                                       // 24
                                                    // 25
for j=1:nc                                       // 26
    S(j)=S(j)+w(j)*y(t);                        // statistics          // 27
    ka(j)=ka(j)+w(j);                           // 28
    thE(j)=S(j)/ka(j);                          // point estimates     // 29
end                                               // 30
    tht=[tht; thE];                             // store               // 31
end                                               // 32

// RESULTS
set(scf(1),'position',[600 100 800 300]);
subplot(131),plot(y,','.')
title 'Data'
subplot(132),plot(wt,','.')
title 'Weights'

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subplot(133),plot(tht)
title 'Evolution of parametr estimates'
plot([1 nd],[thS(1) thS(1)],':')
plot([1 nd],[thS(2) thS(2)],'g:')
set(gca(),'data_bounds',[0 nd 1 8])
disp('Simulated expectations',thS)
disp('Final estimates of expectations',thE)
```

## Description of the program

- Rows 3–5 prepare values of parameters
- Rows 9–13 prepare initial statistics and parameters
- Rows 15–31 perform the time loop
  - 16: generation of the pointer value
  - 17: is simulation of the output
  - 22: computes proximities
  - 23: weights normalized proximities
  - 27–28: update of statistics
  - 29: point estimates of parameters