【正規分布/二項分布/ポアソン分布 Normal/Binomial /Poisson Distribution】

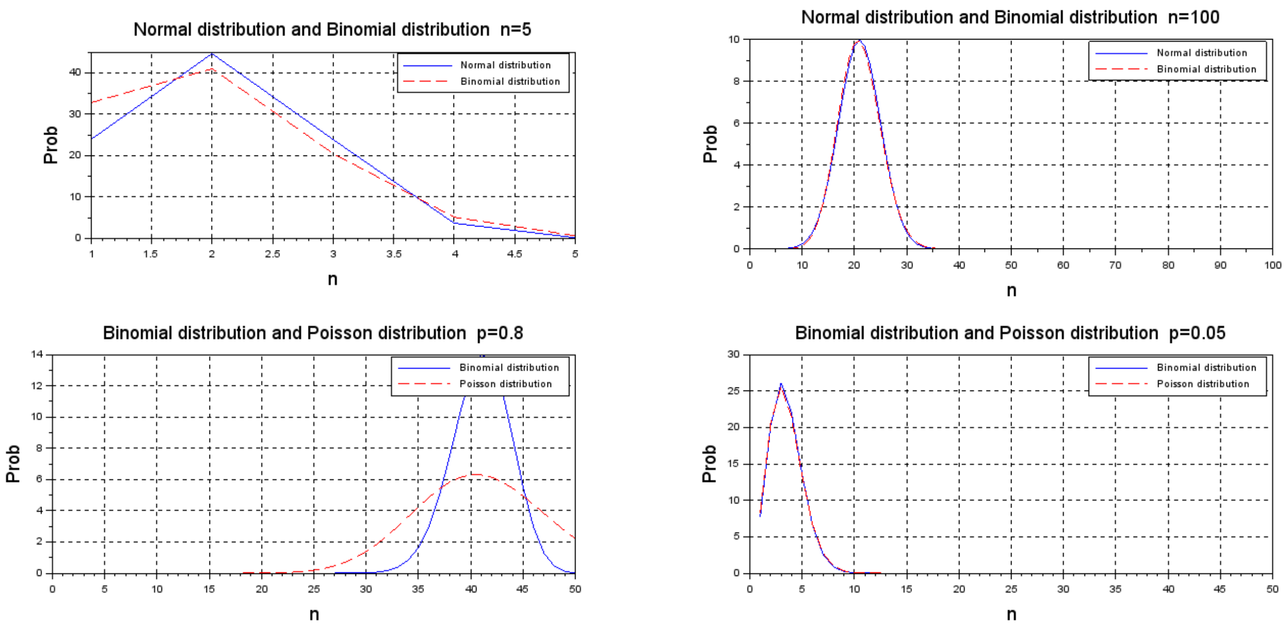

Figure 1: Scilab 実行結果
確率分布近似

Source Code 1: Scilab

```
/////////////////////////////////////////////////
//      確率分布近似
//     Normal/Binomial/Poisson distribution
//     approximation
//                                  M.Tsutsui
/////////////////////////////////////////////////

clear;

funcprot(0);//正規分布
function[res]=Norm_dist(x,myu,sigma)//x:確率変数 myu:平均 sigma:分散

    res=[];
    for k=0:1:x-1;
        res=[res,1/sqrt(2*%pi*sigma)*%e^(-(k-myu)^2/(2*sigma))];
    end

 endfunction

funcprot(0);//二項分布
function[res]=Bino_dist(n,p)//n:試行回数 p:確率

    res=[];
    for k=0:1:n-1;
        res=[res,factorial(n)/(factorial(k)*factorial(n-k))*p^k*(1-p)^(n-k)];
    end

endfunction


funcprot(0);//ポアソン分布
function[res]=Pois_dist(lambda,k)//lambda:λ=np
```

```
    res=[];
    for n=0:1:k-1;
        res=[res,lambda^n*%e^(-lambda)/factorial(n)];
    end

 endfunction

//___正規分布,二項分布近似(nが大きい場合)__//

n=5;//確率変数
p=0.2;//確率

subplot(2,2,1)
plot(Norm_dist(n,n*p,n*p*(1-p))*100);
plot(Bino_dist(n,p)*100,'r--');
xgrid();
legend(['Normal distribution';'Binomial distribution';]);
xlabel("n", "fontsize", 4);
ylabel("Prob", "fontsize", 4);
title('Normal distribution and Binomial distribution  n=5','fontsize',4);


n=100;//確率変数
p=0.2;//確率

subplot(2,2,2)plot(Norm_dist(n,n*p,n*p*(1-p))*100);
plot(Bino_dist(n,p)*100,'r--');
xgrid();
legend(['Normal distribution';'Binomial distribution';]);
xlabel("n", "fontsize", 4);
ylabel("Prob", "fontsize", 4);
title('Normal distribution and Binomial distribution  n=100','fontsize',4);

//__二項分布,ポアソン分布近似(pが小さい場合)__//

n=50;//確率変数
p=0.8;//確率

subplot(2,2,3)
plot(Bino_dist(n,p)*100);
plot(Pois_dist(n*p,n)*100,'r--');
xgrid();
legend(['Binomial distribution';'Poisson distribution';]);
xlabel("n", "fontsize", 4);
ylabel("Prob", "fontsize", 4);
title('Binomial distribution and Poisson distribution  p=0.8','fontsize',4);

n=50;//確率変数
p=0.05;//確率

subplot(2,2,4)
plot(Bino_dist(n,p)*100);
plot(Pois_dist(n*p,n)*100,'r--');
xgrid();
legend(['Binomial distribution';'Poisson distribution';]);
xlabel("n", "fontsize", 4);
ylabel("Prob", "fontsize", 4);
title('Binomial distribution and Poisson distribution  p=0.05','fontsize',4);
```