

## PROJECT 1

ECE-519

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### LDPC ENCODING

An 'N' bit LDPC can be defined by using 'M' parity check equations

Where M – Number of parity check equations.

N – Number of code word bits.

These M parity check equations are represented with the help of a MxN matrix called the parity check matrix H.

Let us understand the above with the help of an example,

Consider a 6 bit long code word  $C_n = \{ C_1, C_2, C_3, C_4, C_5, C_6 \}$  with corresponding H matrix. The parity check equations are given as:-

$$C_1 \oplus C_2 \oplus C_5 = 0;$$

$$C_1 \oplus C_4 \oplus C_6 = 0;$$

$$C_1 \oplus C_2 \oplus C_3 \oplus C_6 = 0$$

If the number of weights that is the number of ones in the rows and columns of the parity check matrix are same, then the matrix is called regular parity check matrix if not it is referred to as a non-regular check matrix.

Next step is to get the H matrix in the systematic form so as to get the generator matrix to construct the code word dictionary so now to get the H matrix in the systematic form we need to use the usual matrix manipulation techniques to get the matrix in the form  $H(\text{systematic}) = [I_M | P_{M \times K}]$  where  $K = N - M$  for a (N,M) LDPC code. This systematic form is then used to form the generator matrix 'G' which is of the form  $G = [P^T K^M | I_K]$ . This generator matrix can be used to generate the code and thereby generate the code dictionary which will have to be transmitted. This generator matrix can be cross verified by using the relation  $G \cdot H^T = 0$ .

### LDPC DECODING

We cannot use conventional maximum likelihood detector due to the non-deterministic nature of the polynomial. Therefore it fails with maximum likelihood, other decoding methods such as belief propagation which is a sub optimal decoding algorithm, works well because each of the parity check bits of the LDPC can be treated as a separate entity and can be decoded.

In belief propagation, the nodes values are constantly sent back and forth from the check nodes to the bit nodes repeatedly for every iteration and finally they arrive at the constant value. The fact that we use soft decoding instead of hard decoding means that the values are computed after many successive iterations.

- 1) b) It used 3 iterations to arrive at the code word. After which the values of Q0 and Q1 attained a constant value and hence the code word did not change.

```

clc;
clear;
C=input('Enter the received codeword'); % receive the code word from the user
H=input('Enter the H matrix'); %get the H matrix from the user
variance=input('Enter the variance of the channel'); %input the variance
[nk,n]=size(H);[w,t]=size(variance);
q1=zeros(n,nk);q0=zeros(n,nk);
r1=zeros(nk,n);r0=zeros(nk,n);
w=1;
while(w<t+1)
%computing the initial q value
for j=1:nk
    for i=1:n
        p(1,i)=1/(1+exp(2*C(1,i)/variance(1,w)));
        if(H(j,i)==1)
            q0(i,j)=p(1,i);
            q1(i,j)=1-p(1,i);
        end
    end
end
iteration=1;
fprintf('\nInitial probability is \n');
display(p);
while(iterations<8)
    fprintf('Iteration number %d\n',iteration);
    fprintf('Variance %d',variance(1,w));
    %computing the values of r
    for i=1:n
        for j=1:nk
            if(H(j,i)==1)
                iprime=1;z=1;
                while(iprime<n+1)
                    if((iprime~=i))
                        z=z*(1-2*q0(iprime,j));
                    end
                    iprime=iprime+1;
                end
                r1(j,i)=0.5+0.5*z;
                r0(j,i)=1-r1(j,i);
            end
        end
    end
    % display(q0);
    % display(q1);
    % display(r1);
    % display(r0);
    %computing the new value of q for the next iteration
    for i=1:n
        for j=1:nk
            if(H(j,i)==1)
                jprime=1;z1=1;z2=1;
                while(jprime<nk+1)
                    if((jprime~=j)&&H(jprime,i)==1)
                        z1=z1*r1(jprime,i);
                        z2=z2*r0(jprime,i);
                    end
                    jprime=jprime+1;
                end
                qtemp1(i,j)=(1-p(1,i))*z1;
            end
        end
    end
end

```

```

        qtemp0(i,j)=p(1,i)*z2;
        sum=qtemp1(i,j)+qtemp0(i,j);
        q1(i,j)=qtemp1(i,j)/(sum);
        q0(i,j)=qtemp0(i,j)/(sum);
    end
end
end
%computing Q value and the code word.
for i=1:n
    z1=1;z2=1;
    for j=1:nk
        if(H(j,i)==1)
            z1=z1*r1(j,i);
            z2=z2*r0(j,i);
        end
        Q0(1,i)=(1-p(1,i))*z1;
        Q1(1,i)=p(1,i)*z2;
        sum=Q1(1,i)+Q0(1,i);
        Q1(1,i)=Q1(1,i)/sum;
        Q0(1,i)=Q0(1,i)/sum;
    end
    if(Q1(1,i)>Q0(1,i))
        output(1,i)=1;
    elseif(Q1(1,i)<Q0(1,i))
        output(1,i)=0;
    end
end
ans(iteration,:)=output;
%display(Q0);display(Q1);
display(output); %displaying the output code word
%outputsize=size(ans);
if(iteration>2)
    if(ans(iteration,:)==ans(iteration-1,:))
        fprintf('It took %d number of iterations \n',iteration);
        %iteration=9;
        break;
    end
end
end
if((output*(H'))==0)
    break;
else
    iteration=iteration+1;
end
end
w=w+1;
end

```

LDPC2

Enter the received codeword[-0.4 -0.2 -1.1 0.6 -0.5 0.5 -0.4 -1.2 0.5 -0.2 -1 0.5]

Enter the H matrix[1 1 1 0 0 0 0 0 0 0 0 0; 0 0 0 1 1 1 0 0 0 0 0 0; 1 0 0 1 0 0 1 0 0 0 0 0; 0 1 0 0 1 0 0 1 0 0 0 0]

Enter the variance of the channel[0.10 0.15 0.20 0.25]

p =

0.9997	0.9820	1.0000	0.0000	1.0000	0.0000	0.9997
1.0000	0.0000	0.9820	1.0000	0.0000		

Iteration number 1

Variance 1.000000e-01

q0 =

0.9997	0	0.9997	0
0.9820	0	0	0.9820
1.0000	0	0	0
0	0.0000	0.0000	0
0	1.0000	0	1.0000
0	0.0000	0	0
0	0	0.9997	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0003	0	0.0003	0
0.0180	0	0	0.0180
0.0000	0	0	0
0	1.0000	1.0000	0
0	0.0000	0	0.0000
0	1.0000	0	0
0	0	0.0003	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9820	0.9997	0.9817	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0.0001	0.9999	0.0001	0
0.0003	0	0	0.9993	0	0	0.0003
0	0	0	0	0	0	0
0	1.0000	0	0	0.9820	0	0
0.9820	0	0	0	0	0	0

r0 =

	0.0180	0.0003	0.0183	0	0	0	0
0	0	0	0	0			
	0	0	0	0.9999	0.0001	0.9999	0
0	0	0	0	0			
	0.9997	0	0	0.0007	0	0	0.9997
0	0	0	0	0			
	0	0.0000	0	0	0.0180	0	0
0.0180	0	0	0	0	0		

Q0 =

	0.0000	1.0000	0.0000	1.0000	0.9796	0.5317	0.0000
0.0000	1.0000	0.0180	0.0000	1.0000			

Q1 =

	1.0000	0.0000	1.0000	0.0000	0.0204	0.4683	1.0000
1.0000	0.0000	0.9820	1.0000	0.0000			

output =

1	0	1	0	0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 2  
Variance 1.000000e-01  
q0 =

1.0000	0	0.9820	0
0.0025	0	0	0.0180
1.0000	0	0	0
0	0.0000	0.0634	0
0	0.9975	0	0.5317
0	0.0000	0	0
0	0	0.9997	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0000	0	0.0180	0
0.9975	0	0	0.9820
0.0000	0	0	0
0	1.0000	0.9366	0
0	0.0025	0	0.4683
0	1.0000	0	0
0	0	0.0003	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

	0.0025	1.0000	0.0025	0	0	0	0
0	0	0	0	0	0	0	0
	0	0	0	0.0025	1.0000	0.0025	0
0	0	0	0	0	0	0	0
	0.0637	0	0	0.9817	0	0	0.0791
0	0	0	0	0	0	0	0
	0	0.5317	0	0	0.0180	0	0
0.4695	0	0	0	0	0	0	0

r0 =

	0.9975	0.0000	0.9975	0	0	0	0
0	0	0	0	0	0	0	0
	0	0	0	0.9975	0.0000	0.9975	0
0	0	0	0	0	0	0	0
	0.9363	0	0	0.0183	0	0	0.9209
0	0	0	0	0	0	0	0
	0	0.4683	0	0	0.9820	0	0
0.5305	0	0	0	0	0	0	0

Q0 =

	0.0000	1.0000	0.0000	1.0000	0.0180	0.9820	0.0000
0.0000	1.0000	0.0180	0.0000	1.0000	0.0000	0.0000	0.0000

Q1 =

	1.0000	0.0000	1.0000	0.0000	0.9820	0.0180	1.0000
1.0000	0.0000	0.9820	1.0000	0.0000	0.0000	0.0000	0.0000

output =

1	0	1	0	1	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 3

Variance 1.000000e-01

q0 =

1.0000	0	1.0000	0
0.9796	0	0	0.0000
1.0000	0	0	0
0	0.0000	0.0024	0
0	1.0000	0	0.5000
0	0.0000	0	0
0	0	0.9997	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0000	0	0.0000	0
0.0204	0	0	1.0000
0.0000	0	0	0
0	1.0000	0.9976	0
0	0.0000	0	0.5000
0	1.0000	0	0
0	0	0.0003	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9796	1.0000	0.9796	0	0	0	0
0	0	0	0	0		
	0	0	0	0.0000	1.0000	0.0000
0	0	0	0	0		
0.0028	0	0	0.9997	0	0	0.0024
0	0	0	0	0		
0	0.5000	0	0	0	0.0000	0
0.5000	0	0	0	0	0	

r0 =

0.0204	0.0000	0.0204	0	0	0	0
0	0	0	0	0		
	0	0	0	1.0000	0.0000	1.0000
0	0	0	0	0		
0.9972	0	0	0.0003	0	0	0.9976
0	0	0	0	0		
0	0.5000	0	0	0	1.0000	0
0.5000	0	0	0	0	0	

Q0 =

0.0000	0.9988	0.0000	1.0000	0.0000	0.0204	0.0000
0.0000	1.0000	0.0180	0.0000	1.0000		

Q1 =

1.0000	0.0012	1.0000	0.0000	1.0000	0.9796	1.0000
1.0000	0.0000	0.9820	1.0000	0.0000		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 4  
Variance 1.000000e-01

q0 =

1.0000	0	0.9841	0
0.9820	0	0	0.0012

1.0000	0	0	0
0	0.0000	0.1173	0
0	1.0000	0	0.5006
0	0.0000	0	0
0	0	0.9997	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0000	0	0.0159	0
0.0180	0	0	0.9988
0.0000	0	0	0
0	1.0000	0.8827	0
0	0.0000	0	0.4994
0	1.0000	0	0
0	0	0.0003	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9820	1.0000	0.9820	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0000	1.0000	0.0000
0	0	0	0	0	0	0
0.1176	0	0	0	0.9838	0	0.1295
0	0	0	0	0	0	0
0.4994	0.5006	0	0	0	0.0012	0
	0	0	0	0	0	0

r0 =

0.0180	0.0000	0.0180	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	1.0000	0.0000	1.0000
0	0	0	0	0	0	0
0.8824	0	0	0	0.0162	0	0.8705
0	0	0	0	0	0	0
0.5006	0.4994	0	0	0	0.9988	0
	0	0	0	0	0	0

Q0 =

0.0024	0.9999	0.0000	0.9978	0.0012	0.0001	0.0000
0.0000	1.0000	0.0180	0.0000	1.0000		

Q1 =



0.9976	0.0001	1.0000	0.0022	0.9988	0.9999	1.0000
1.0000	0.0000	0.9820	1.0000	0.0000		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

It took 4 number of iterations

p =

0.9952	0.9350	1.0000	0.0003	0.9987	0.0013	0.9952
1.0000	0.0013	0.9350	1.0000	0.0013		

Iteration number 1

Variance 1.500000e-01

q0 =

0.9952	0	0.9952	0
0.9350	0	0	0.9350
1.0000	0	0	0
0	0.0003	0.0003	0
0	0.9987	0	0.9987
0	0.0013	0	0
0	0	0.9952	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0048	0	0.0048	0
0.0650	0	0	0.0650
0.0000	0	0	0
0	0.9997	0.9997	0
0	0.0013	0	0.0013
0	0.9987	0	0
0	0	0.0048	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9350	0.9952	0.9309	0	0	0	0
0	0	0	0	0		
0	0	0	0.0025	0.9984	0.0016	0
0.0051	0	0	0.9904	0	0	0.0051
0	0	0	0	0		
0	0.9987	0	0	0.9350	0	0
0.9339	0	0	0	0		

r0 =

	0.0650	0.0048	0.0691	0	0	0	0
0	0	0	0	0			
	0	0	0	0.9975	0.0016	0.9984	0
0	0	0	0	0			
	0.9949	0	0	0.0096	0	0	0.9949
0	0	0	0	0			
	0	0.0013	0	0	0.0650	0	0
0.0661	0	0	0	0	0		

Q0 =

	0.0004	0.9999	0.0000	0.9987	0.9193	0.5582	0.0000
0.0000	0.9987	0.0650	0.0000	0.9987			

Q1 =

	0.9996	0.0001	1.0000	0.0013	0.0807	0.4418	1.0000
1.0000	0.0013	0.9350	1.0000	0.0013			

output =

1	0	1	0	0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 2

Variance 1.500000e-01

q0 =

1.0000	0	0.9350	0
0.0180	0	0	0.0650
1.0000	0	0	0
0	0.0000	0.1165	0
0	0.9820	0	0.5582
0	0.0013	0	0
0	0	0.9952	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0000	0	0.0650	0
0.9820	0	0	0.9350
0.0000	0	0	0
0	1.0000	0.8835	0
0	0.0180	0	0.4418
0	0.9987	0	0
0	0	0.0048	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0

```

0      0      0      0

r1 =
0.0180  1.0000  0.0180  0      0      0      0
0      0      0      0      0      0      0
0      0      0      0      0.0192  0.9987  0.0180  0
0      0      0      0      0.9309  0      0      0.1663
0      0      0      0      0      0      0      0
0.4493  0.5582  0      0      0      0.0650  0      0
0.4493  0      0      0      0      0      0      0

r0 =
0.9820  0.0000  0.9820  0      0      0      0
0      0      0      0      0      0      0
0      0      0      0      0.9808  0.0013  0.9820  0
0      0      0      0      0.0691  0      0      0.8337
0      0      0      0      0      0      0      0
0.5507  0.4418  0      0      0      0.9350  0      0
0.5507  0      0      0      0      0      0      0

Q0 =
0.0000  0.9997  0.0000  0.9987  0.0648  0.9350  0.0010
0.0000  0.9987  0.0650  0.0000  0.9987  0.9350  0.0010

Q1 =
1.0000  0.0003  1.0000  0.0013  0.9352  0.0650  0.9990
1.0000  0.0013  0.9350  1.0000  0.0013  0.9350  0.9990

output =
1      0      1      0      1      0      1      1      0      1      1      0

Iteration number 3
Variance 1.500000e-01
q0 =
0.9993  0      0.9999  0
0.9193  0      0      0.0004
1.0000  0      0      0
0      0.0000  0.0168  0
0      0.9999  0      0.5006
0      0.0013  0      0
0      0      0.9952  0
0      0      0      1.0000
0      0      0      0
0      0      0      0
0      0      0      0
0      0      0      0
0      0      0      0

```

q1 =

0.0007	0	0.0001	0
0.0807	0	0	0.9996
0.0000	0	0	0
0	1.0000	0.9832	0
0	0.0001	0	0.4994
0	0.9987	0	0
0	0	0.0048	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9193	0.9993	0.9187	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0014	0.9987	0.0001
0	0	0	0	0	0	0
0.0215	0	0	0	0.9951	0	0.0169
0	0	0	0	0	0	0
0	0.5006	0	0	0	0.0004	0
0.4994	0	0	0	0	0	0

r0 =

0.0807	0.0007	0.0813	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9986	0.0013	0.9999
0	0	0	0	0	0	0
0.9785	0	0	0	0.0049	0	0.9831
0	0	0	0	0	0	0
0	0.4994	0	0	0	0.9996	0
0.5006	0	0	0	0	0	0

Q0 =

0.0012	0.9906	0.0000	0.9988	0.0004	0.0818	0.0001
0.0000	0.9987	0.0650	0.0000	0.9987	0	0

Q1 =

0.9988	0.0094	1.0000	0.0012	0.9996	0.9182	0.9999
1.0000	0.0013	0.9350	1.0000	0.0013	0	0

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 4

Variance 1.500000e-01

q0 =

0.9999	0	0.9479	0
0.9349	0	0	0.0094
1.0000	0	0	0
0	0.0000	0.1977	0
0	1.0000	0	0.5048
0	0.0013	0	0
0	0	0.9952	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0001	0	0.0521	0
0.0651	0	0	0.9906
0.0000	0	0	0
0	1.0000	0.8023	0
0	0.0000	0	0.4952
0	0.9987	0	0
0	0	0.0048	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.9349	0.9999	0.9348	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0013	0.9987	0.0000
0	0	0	0	0	0	0
0.2006	0	0	0	0.9436	0	0.2292
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4952	0.5048	0	0	0	0.0094	0
	0			0	0	

r0 =

0.0651	0.0001	0.0652	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9987	0.0013	1.0000
0	0	0	0	0	0	0
0.7994	0	0	0	0.0564	0	0.7708
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5048	0.4952	0	0	0	0.9906	0
	0			0	0	

Q0 =

0.0171	0.9985	0.0000	0.9845	0.0094	0.0017	0.0014
0.0000	0.9987	0.0650	0.0000	0.9987		

Q1 =

0.9829	0.0015	1.0000	0.0155	0.9906	0.9983	0.9986
1.0000	0.0013	0.9350	1.0000	0.0013		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

It took 4 number of iterations

p =

0.9820	0.8808	1.0000	0.0025	0.9933	0.0067	0.9820
1.0000	0.0067	0.8808	1.0000	0.0067		

Iteration number 1

Variance 2.000000e-01

q0 =

0.9820	0	0.9820	0
0.8808	0	0	0.8808
1.0000	0	0	0
0	0.0025	0.0025	0
0	0.9933	0	0.9933
0	0.0067	0	0
0	0	0.9820	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0180	0	0.0180	0
0.1192	0	0	0.1192
0.0000	0	0	0
0	0.9975	0.9975	0
0	0.0067	0	0.0067
0	0.9933	0	0
0	0	0.0180	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.8808	0.9820	0.8671	0	0	0	0
0	0	0	0	0		
0	0	0	0.0133	0.9909	0.0091	0
0.0204	0	0	0.9647	0	0	0.0204
0	0	0	0			

	0	0.9933	0	0	0	0.8808	0	0
0.8757		0	0	0	0	0		

r0 =

	0.1192	0.0180	0.1329	0	0	0	0
0	0	0	0	0	0		
	0	0	0	0.9867	0.0091	0.9909	0
0	0	0	0	0			
	0.9796	0	0	0.0353	0	0	0.9796
0	0	0	0	0			
	0	0.0067	0	0	0.1192	0	0
0.1243		0	0	0	0		

Q0 =

	0.0028	0.9991	0.0001	0.9933	0.8438	0.5777	0.0004
0.0000	0.9933	0.1192	0.0000	0.9933			

Q1 =

	0.9972	0.0009	0.9999	0.0067	0.1562	0.4223	0.9996
1.0000	0.0067	0.8808	1.0000	0.0067			

output =

1	0	1	0	0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 2  
Variance 2.000000e-01  
q0 =

0.9996	0	0.8808	0
0.0475	0	0	0.1193
1.0000	0	0	0
0	0.0001	0.1554	0
0	0.9526	0	0.5777
0	0.0067	0	0
0	0	0.9820	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0004	0	0.1192	0
0.9525	0	0	0.8807
0.0000	0	0	0
0	0.9999	0.8446	0
0	0.0474	0	0.4223
0	0.9933	0	0
0	0	0.0180	0
0	0	0	0.0000

0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.0475	0.9996	0.0478	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0.0535	0.9932	0.0475	0
0	0	0	0	0	0	0.2375
0	0	0	0.8671	0	0	0
0	0	0	0	0.1193	0	0
0.4409	0	0	0	0	0	0

r0 =

0.9525	0.0004	0.9522	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0.9465	0.0068	0.9525	0
0	0	0	0	0	0	0.7625
0	0	0	0.1329	0	0	0
0	0	0	0	0.8807	0	0
0.5591	0	0	0	0	0	0

Q0 =

0.0002	0.9979	0.0000	0.9933	0.1179	0.8810	0.0057
0.0000	0.9933	0.1192	0.0000	0.9933		

Q1 =

0.9998	0.0021	1.0000	0.0067	0.8821	0.1190	0.9943
1.0000	0.0067	0.8808	1.0000	0.0067		

output =

1	0	1	0	1	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 3  
Variance 2.000000e-01  
q0 =

0.9963	0	0.9991	0
0.8438	0	0	0.0029
1.0000	0	0	0
0	0.0004	0.0420	0
0	0.9991	0	0.5033
0	0.0067	0	0
0	0	0.9820	0
0	0	0	1.0000
0	0	0	0
0	0	0	0



0	0	0	0
0	0	0	0

q1 =

0.0037	0	0.0009	0
0.1562	0	0	0.9971
0.0000	0	0	0
0	0.9996	0.9580	0
0	0.0009	0	0.4967
0	0.9933	0	0
0	0	0.0180	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.8438	0.9963	0.8413	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0.0076	0.9929	0.0013	0
0.0585	0	0	0.9811	0	0	0.0429
0	0	0	0	0	0	0
0.4967	0.5033	0	0	0.0029	0	0
	0	0	0	0		

r0 =

0.1562	0.0037	0.1587	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0.9924	0.0071	0.9987	0
0.9415	0	0	0.0189	0	0	0.9571
0	0	0	0	0	0	0
0.5033	0.4967	0	0	0.9971	0	0
	0	0	0	0		

Q0 =

0.0061	0.9737	0.0001	0.9938	0.0028	0.1610	0.0008
0.0000	0.9933	0.1192	0.0000	0.9933		

Q1 =

0.9939	0.0263	0.9999	0.0062	0.9972	0.8390	0.9992
1.0000	0.0067	0.8808	1.0000	0.0067		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 4  
Variance 2.000000e-01  
q0 =

0.9989	0	0.9100	0
0.8794	0	0	0.0267
1.0000	0	0	0
0	0.0000	0.2447	0
0	1.0000	0	0.5137
0	0.0067	0	0
0	0	0.9820	0
0	0	0	1.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0011	0	0.0900	0
0.1206	0	0	0.9733
0.0000	0	0	0
0	1.0000	0.7553	0
0	0.0000	0	0.4863
0	0.9933	0	0
0	0	0.0180	0
0	0	0	0.0000
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.8794	0.9988	0.8785	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0067	0.9933	0.0001
0	0	0	0	0	0	0
0.2539	0	0	0	0.8952	0	0.2907
0	0	0	0	0	0	0
0	0.5137	0	0	0	0.0267	0
0.4870	0	0	0	0	0	0

r0 =

0.1206	0.0012	0.1215	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9933	0.0067	0.9999
0	0	0	0	0	0	0
0.7461	0	0	0	0.1048	0	0.7093
0	0	0	0	0	0	0
0	0.4863	0	0	0	0.9733	0
0.5130	0	0	0	0	0	0

Q0 =

0.0435	0.9920	0.0001	0.9588	0.0265	0.0099	0.0074
0.0000	0.9933	0.1192	0.0000	0.9933		

Q1 =

0.9565	0.0080	0.9999	0.0412	0.9735	0.9901	0.9926
1.0000	0.0067	0.8808	1.0000	0.0067		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

It took 4 number of iterations

p =

0.9608	0.8320	0.9998	0.0082	0.9820	0.0180	0.9608
0.9999	0.0180	0.8320	0.9997	0.0180		

Iteration number 1  
Variance 2.500000e-01  
q0 =

0.9608	0	0.9608	0
0.8320	0	0	0.8320
0.9998	0	0	0
0	0.0082	0.0082	0
0	0.9820	0	0.9820
0	0.0180	0	0
0	0	0.9608	0
0	0	0	0.9999
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0392	0	0.0392	0
0.1680	0	0	0.1680
0.0002	0	0	0
0	0.9918	0.9918	0
0	0.0180	0	0.0180
0	0.9820	0	0
0	0	0.0392	0
0	0	0	0.0001
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.8319	0.9607	0.8060	0	0	0	0
0	0	0	0	0		

	0	0	0	0.0353	0.9741	0.0259	0
0	0	0	0	0			
	0.0467	0	0	0.9247	0	0	0.0467
0	0	0	0	0			
	0	0.9819	0	0	0.8320	0	0
0.8201	0	0	0	0	0		

r0 =

	0.1681	0.0393	0.1940	0	0	0	0
0	0	0	0	0			
	0	0	0	0.9647	0.0259	0.9741	0
0	0	0	0	0			
	0.9533	0	0	0.0753	0	0	0.9533
0	0	0	0	0			
	0	0.0181	0	0	0.1680	0	0
0.1799	0	0	0	0	0		

Q0 =

	0.0098	0.9963	0.0006	0.9820	0.7736	0.5917	0.0020
0.0003	0.9820	0.1680	0.0003	0.9820			

Q1 =

	0.9902	0.0037	0.9994	0.0180	0.2264	0.4083	0.9980
0.9997	0.0180	0.8320	0.9997	0.0180			

output =

1	0	1	0	0	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 2  
Variance 2.500000e-01  
q0 =

0.9980	0	0.8321	0
0.0835	0	0	0.1685
0.9998	0	0	0
0	0.0007	0.1835	0
0	0.9169	0	0.5917
0	0.0180	0	0
0	0	0.9608	0
0	0	0	0.9999
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0020	0	0.1679	0
0.9165	0	0	0.8315
0.0002	0	0	0
0	0.9993	0.8165	0

0	0.0831	0	0.4083
0	0.9820	0	0
0	0	0.0392	0
0	0	0	0.0001
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.0836	0.9979	0.0851	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0981	0.9814	0.0837
0	0	0	0	0	0	0
0.2083	0	0	0	0.8061	0	0.2898
0	0	0	0	0	0	0
0	0.5917	0	0	0	0.1685	0
0.4392	0	0	0	0	0	0

r0 =

0.9164	0.0021	0.9149	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9019	0.0186	0.9163
0	0	0	0	0	0	0
0.7917	0	0	0	0.1939	0	0.7102
0	0	0	0	0	0	0
0	0.4083	0	0	0	0.8315	0
0.5608	0	0	0	0	0	0

Q0 =

0.0010	0.9927	0.0000	0.9821	0.1636	0.8330	0.0164
0.0001	0.9820	0.1680	0.0003	0.9820		

Q1 =

0.9990	0.0073	1.0000	0.0179	0.8364	0.1670	0.9836
0.9999	0.0180	0.8320	0.9997	0.0180		

output =

1	0	1	0	1	0	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

Iteration number 3  
Variance 2.500000e-01  
q0 =

0.9894	0	0.9963	0
0.7737	0	0	0.0105
0.9998	0	0	0
0	0.0020	0.0703	0
0	0.9963	0	0.5090
0	0.0180	0	0

0	0	0.9608	0
0	0	0	0.9999
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0106	0	0.0037	0
0.2263	0	0	0.9895
0.0002	0	0	0
0	0.9980	0.9297	0
0	0.0037	0	0.4910
0	0.9820	0	0
0	0	0.0392	0
0	0	0	0.0001
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.7736	0.9892	0.7679	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0216	0.9801	0.0057
0	0	0	0	0	0	0.0735
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4912	0	0	0	0	0	0

r0 =

0.2264	0.0108	0.2321	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9784	0.0199	0.9943
0	0	0	0	0	0	0.9265
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5088	0	0	0	0	0	0

Q0 =

0.0159	0.9506	0.0005	0.9837	0.0096	0.2371	0.0032
0.0001	0.9820	0.1680	0.0003	0.9820		

Q1 =

0.9841	0.0494	0.9995	0.0163	0.9904	0.7629	0.9968
0.9999	0.0180	0.8320	0.9997	0.0180		

output =

1 0 1 0 1 1 1 1 0 1 1 0

Iteration number 4

Variance 2.500000e-01

q0 =

0.9953	0	0.8778	0
0.8269	0	0	0.0511
0.9998	0	0	0
0	0.0004	0.2720	0
0	0.9998	0	0.5256
0	0.0180	0	0
0	0	0.9608	0
0	0	0	0.9999
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

q1 =

0.0047	0	0.1222	0
0.1731	0	0	0.9489
0.0002	0	0	0
0	0.9996	0.7280	0
0	0.0002	0	0.4744
0	0.9820	0	0
0	0	0.0392	0
0	0	0	0.0001
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

r1 =

0.8268	0.9951	0.8239	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.0182	0.9817	0.0006
0.2899	0	0	0	0.8482	0	0
0	0	0	0	0	0	0.3277
0	0	0	0	0	0	0
0.4770	0.5256	0	0	0	0.0512	0
	0	0	0	0	0	0

r0 =

0.1732	0.0049	0.1761	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0.9818	0.0183	0.9994
0	0	0	0	0	0	0
0.7101	0	0	0	0.1518	0	0
0	0	0	0	0	0	0.6723
0	0	0	0	0	0	0
0.5230	0.4744	0	0	0	0.9488	0
	0	0	0	0	0	0

Q0 =

0.0736	0.9786	0.0007	0.9263	0.0502	0.0298	0.0195
0.0001	0.9820	0.1680	0.0003	0.9820		

Q1 =

0.9264	0.0214	0.9993	0.0737	0.9498	0.9702	0.9805
0.9999	0.0180	0.8320	0.9997	0.0180		

output =

1	0	1	0	1	1	1	1	0	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---

It took 4 number of iterations  
diary off



LDPC2

Enter the received codeword[1.1368 -0.0733 -1.3096 0.909 -0.6375 -1.3766  
0.624 1.0119 -0.0165 0.0448 0.859 -0.0705 -0.814 0.3096 1.0431 -1.036  
0.0627 -1.0187 1.0302 -0.7368]

Enter the H matrix[1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0;0 0 0 0 1 1 1  
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0;0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0;0 0 0 0  
0 0 0 0 0 0 0 0 1 1 1 1 0 0 0 0;0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1;1  
0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0;0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 0  
0 0;0 0 1 0 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 0;0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 1  
0 0 0 1 0;0 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1;1 0 0 0 0 1 0 0 0 0 0 1  
0 0 0 0 0 1 0 0;0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0;0 0 1 0 0 0 0 1 0  
0 0 0 1 0 0 0 0 0 1 0 ;0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0 0 0 ;0 0 0 0 1  
0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 ]

Enter the variance of the channel[0.3 0.4 0.5 0.6 0.7]

p =

Columns 1 through 7

0.0005	0.6198	0.9998	0.0023	0.9859	0.9999	0.0154
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0012	0.5275	0.4259	0.0032	0.6154	0.9956	0.1126
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0010	0.9990	0.3970	0.9989	0.0010	0.9927
--------	--------	--------	--------	--------	--------

Iteration number 1

Variance 3.000000e-01

q0 =

Columns 1 through 7

0.0005	0	0	0	0	0.0005	0
0.6198	0	0	0	0	0	0.6198
0.9998	0	0	0	0	0	0
0.0023	0	0	0	0	0	0
0	0.9859	0	0	0	0.9859	0
0	0.9999	0	0	0	0	0.9999
0	0.0154	0	0	0	0	0
0	0.0012	0	0	0	0	0
0	0	0.5275	0	0	0.5275	0
0	0	0.4259	0	0	0	0.4259
0	0	0.0032	0	0	0	0
0	0	0.6154	0	0	0	0
0	0	0	0.9956	0	0.9956	0
0	0	0	0.1126	0	0	0
0	0	0	0.0010	0	0	0
0	0	0	0.9990	0	0	0
0	0	0	0	0.3970	0	0.3970
0	0	0	0	0.9989	0	0
0	0	0	0	0.0010	0	0
0	0	0	0	0.9927	0	0

Columns 8 through 14

0	0	0	0.0005	0	0	0
0	0	0	0	0.6198	0	0

0.9998	0	0	0	0	0.9998	0
0	0.0023	0	0	0	0	0.0023
0	0	0	0	0	0	0
0	0	0	0.9999	0	0	0
0.0154	0	0	0	0.0154	0	0
0	0	0.0012	0	0	0.0012	0
0	0	0	0	0	0	0.5275
0	0	0	0	0	0	0
0	0.0032	0	0	0.0032	0	0
0	0	0.6154	0.6154	0	0	0
0	0	0	0	0	0.9956	0
0.1126	0	0	0	0	0	0.1126
0	0.0010	0	0	0	0	0
0	0	0.9990	0	0.9990	0	0
0	0	0	0	0	0	0.3970
0.9989	0	0	0.9989	0	0	0
0	0.0010	0	0	0	0.0010	0
0	0	0.9927	0	0	0	0

Column 15

0
0
0
0
0.9859
0
0
0
0
0.4259
0
0
0
0
0.0010
0
0
0
0
0.9927

q1 =

Columns 1 through 7

0.9995	0	0	0	0	0.9995	0
0.3802	0	0	0	0	0	0.3802
0.0002	0	0	0	0	0	0
0.9977	0	0	0	0	0	0
0	0.0141	0	0	0	0.0141	0
0	0.0001	0	0	0	0	0.0001
0	0.9846	0	0	0	0	0
0	0.9988	0	0	0	0	0
0	0	0.4725	0	0	0.4725	0
0	0	0.5741	0	0	0	0.5741
0	0	0.9968	0	0	0	0
0	0	0.3846	0	0	0	0
0	0	0	0.0044	0	0.0044	0

0	0	0	0.8874	0	0	0
0	0	0	0.9990	0	0	0
0	0	0	0.0010	0	0	0
0	0	0	0	0.6030	0	0.6030
0	0	0	0	0.0011	0	0
0	0	0	0	0.9990	0	0
0	0	0	0	0.0073	0	0

Columns 8 through 14

0	0	0	0.9995	0	0	0
0	0	0	0	0.3802	0	0
0.0002	0	0	0	0	0.0002	0
0	0.9977	0	0	0	0	0.9977
0	0	0	0	0	0	0
0	0	0	0.0001	0	0	0
0.9846	0	0	0	0.9846	0	0
0	0	0.9988	0	0	0.9988	0
0	0	0	0	0	0	0.4725
0	0	0	0	0	0	0
0	0.9968	0	0	0.9968	0	0
0	0	0.3846	0.3846	0	0	0
0	0	0	0	0	0.0044	0
0.8874	0	0	0	0	0	0.8874
0	0.9990	0	0	0	0	0
0	0	0.0010	0	0.0010	0	0
0	0	0	0	0	0	0.6030
0.0011	0	0	0.0011	0	0	0
0	0.9990	0	0	0	0.9990	0
0	0	0.0073	0	0	0	0

Column 15

0
0
0
0
0.0141
0
0
0
0
0.5741
0
0
0
0
0.9990
0
0
0
0
0.0073

r1 =

Columns 1 through 7

0.6192	0.0030	0.3809	0.6196	0	0	0
--------	--------	--------	--------	---	---	---

0	0	0	0	0.0166	0.0301	0.9847
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4735	0	0	0	0.5272	0	0
0	0.4847	0	0	0	0.4963	0
0	0	0.1254	0	0	0	0.8864
0	0	0	0.9948	0	0	0
0	0	0	0	0	0	0
0.3849	0	0	0	0	0.6150	0
0	0.0195	0	0	0	0	0.6188
0	0	0.0066	0	0	0	0
0	0	0	0.4956	0	0	0
0	0	0	0	0.4271	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9709	0	0	0	0	0	0
0	0.4830	0.5063	0.5009	0.4960	0	0
0	0	0	0	0	0.1142	0.9937
0	0	0	0	0	0	0
0	0.9812	0	0	0	0.5267	0
0	0	0.5247	0	0	0	0
0	0	0	0	0	0	0.9834
0	0	0	0.9957	0	0	0
0.3865	0	0	0	0.9906	0	0
0	0	0	0	0.9983	0	0
0	0	0	0.6159	0	0	0
0.9944	0	0	0	0	0.0024	0
0	0.5794	0	0	0	0	0.4944
0	0	0.9779	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.8832	0.1168	0	0	0	0
0	0	0.9906	0.3987	0.6013	0.3974
0	0	0	0	0	0
0	0	0.5178	0	0	0
0	0	0	0.1247	0	0
0.9934	0	0	0	0.9935	0
0	0.6134	0	0	0	0.6149
0	0	0	0.6152	0	0
0	0.3846	0	0	0	0
0	0	0	0	0.9943	0
0	0	0.4788	0	0	0
0.5710	0	0	0	0	0.4281

r0 =

Columns 1 through 7

0.3808	0.9970	0.6191	0.3804	0	0	0
0	0	0	0	0.9834	0.9699	0.0153
0	0	0	0	0	0	0
0	0	0	0	0	0	0

0	0	0	0	0	0	0
0.5265	0	0	0	0.4728	0	0
0	0.5153	0	0	0	0.5037	0
0	0	0.8746	0	0	0	0.1136
0	0	0	0.0052	0	0	0
0	0	0	0	0	0	0
0.6151	0	0	0	0	0.3850	0
0	0.9805	0	0	0	0	0.3812
0	0	0.9934	0	0	0	0
0	0	0	0.5044	0	0	0
0	0	0	0	0.5729	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0291	0	0	0	0	0	0
0	0.5170	0.4937	0.4991	0.5040	0	0
0	0	0	0	0	0.8858	0.0063
0	0	0	0	0	0	0
0	0.0188	0	0	0	0.4733	0
0	0	0.4753	0	0	0	0
0	0	0	0	0	0	0.0166
0	0	0	0.0043	0	0	0
0.6135	0	0	0	0.0094	0	0
0	0	0	0	0.0017	0	0
0	0	0	0.3841	0	0	0
0.0056	0	0	0	0	0.9976	0
0	0.4206	0	0	0	0	0.5056
0	0	0.0221	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.1168	0.8832	0	0	0	0
0	0	0.0094	0.6013	0.3987	0.6026
0	0	0	0	0	0
0	0	0.4822	0	0	0
0	0	0	0.8753	0	0
0.0066	0	0	0	0.0065	0
0	0.3866	0	0	0	0.3851
0	0	0	0.3848	0	0
0	0.6154	0	0	0	0
0	0	0	0	0.0057	0
0	0	0.5212	0	0	0
0.4290	0	0	0	0	0.5719

Q0 =

Columns 1 through 7

0.9994	0.0000	0.0000	1.0000	0.0002	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	0.9836	0.9854	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0001	0.9937	0.0002	1.0000	0.0058
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0006	1.0000	1.0000	0.0000	0.9998	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0164	0.0146	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	0.9999	0.0063	0.9998	0.0000	0.9942
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 2

Variance 3.000000e-01

q0 =

Columns 1 through 7

0.0009	0	0	0	0	0.0005	0
0.9887	0	0	0	0	0	1.0000
1.0000	0	0	0	0	0	0
0.0000	0	0	0	0	0	0
0	0.9883	0	0	0	0.9998	0
0	0.9998	0	0	0	0	1.0000
0	0.0012	0	0	0	0	0
0	0.0000	0	0	0	0	0
0	0	0.0153	0	0	0.4645	0
0	0	0.0149	0	0	0	0.0161
0	0	0.0000	0	0	0	0
0	0	0.0000	0	0	0	0
0	0	0	1.0000	0	1.0000	0
0	0	0	0.0022	0	0	0
0	0	0	0.0000	0	0	0
0	0	0	0.9990	0	0	0
0	0	0	0	0.4003	0	0.0068
0	0	0	0	0.9997	0	0
0	0	0	0	0.0000	0	0
0	0	0	0	0.9913	0	0

Columns 8 through 14

0	0	0	0.0003	0	0	0
0	0	0	0	0.9983	0	0

1.0000	0	0	0	0	1.0000	0
0	0.0015	0	0	0	0	0.0000
0	0	0	0	0	0	0
0	0	0	1.0000	0	0	0
0.0001	0	0	0	0.0000	0	0
0	0	0.0000	0	0	0.0001	0
0	0	0	0	0	0	0.0224
0	0	0	0	0	0	0
0	0.0020	0	0	0.0000	0	0
0	0	0.0028	0.0153	0	0	0
0	0	0	0	0	0.9994	0
0.0008	0	0	0	0	0	0.0000
0	0.0001	0	0	0	0	0
0	0	0.9999	0	0.9998	0	0
0	0	0	0	0	0	0.0058
0.9988	0	0	0.9999	0	0	0
0	0.0000	0	0	0	0.0000	0
0	0	0.9964	0	0	0	0

Column 15

0  
0  
0  
0  
0.9997  
0  
0  
0  
0  
0  
0.3959  
0  
0  
0  
0  
0  
0.0000  
0  
0  
0  
0  
0  
0.9923

q1 =

Columns 1 through 7

0.9991	0	0	0	0	0.9995	0
0.0113	0	0	0	0	0	0.0000
0.0000	0	0	0	0	0	0
1.0000	0	0	0	0	0	0
0	0.0117	0	0	0	0.0002	0
0	0.0002	0	0	0	0	0.0000
0	0.9988	0	0	0	0	0
0	1.0000	0	0	0	0	0
0	0	0.9847	0	0	0.5355	0
0	0	0.9851	0	0	0	0.9839
0	0	1.0000	0	0	0	0
0	0	1.0000	0	0	0	0
0	0	0	0.0000	0	0.0000	0

0	0	0	0.9978	0	0	0
0	0	0	1.0000	0	0	0
0	0	0	0.0010	0	0	0
0	0	0	0	0.5997	0	0.9932
0	0	0	0	0.0003	0	0
0	0	0	0	1.0000	0	0
0	0	0	0	0.0087	0	0

Columns 8 through 14

0	0	0	0.9997	0	0	0
0	0	0	0	0.0017	0	0
0.0000	0	0	0	0	0.0000	0
0	0.9985	0	0	0	0	1.0000
0	0	0	0	0	0	0
0	0	0	0.0000	0	0	0
0.9999	0	0	0	1.0000	0	0
0	0	1.0000	0	0	0.9999	0
0	0	0	0	0	0	0.9776
0	0	0	0	0	0	0
0	0.9980	0	0	1.0000	0	0
0	0	0.9972	0.9847	0	0	0
0	0	0	0	0	0.0006	0
0.9992	0	0	0	0	0	1.0000
0	0.9999	0	0	0	0	0
0	0	0.0001	0	0.0002	0	0
0	0	0	0	0	0	0.9942
0.0012	0	0	0.0001	0	0	0
0	1.0000	0	0	0	1.0000	0
0	0	0.0036	0	0	0	0

Column 15

0
0
0
0
0.0003
0
0
0
0
0.6041
0
0
0
0
1.0000
0
0
0
0
0.0077

r1 =

Columns 1 through 7

0.9887	0.0009	0.0122	0.9878	0	0	0
--------	--------	--------	--------	---	---	---



0	0	0	0	0.0014	0.0129	0.9881
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5355	0	0	0	0.4645	0	0
0	0.0226	0	0	0	0.0227	0
0	0	0.0022	0	0	0	0.9980
0	0	0	0.9979	0	0	0
0	0	0	0	0	0	0
0.9846	0	0	0	0	0.0157	0
0	0.0003	0	0	0	0	0.9980
0	0	0.0007	0	0	0	0
0	0	0	0.9720	0	0	0
0	0	0	0	0.3975	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9869	0	0	0	0	0	0
0	0.9850	0.9847	0.9702	0.9702	0	0
0	0	0	0	0	0.0032	0.9990
0	0	0	0	0	0	0
0	0.9993	0	0	0	0.4645	0
0	0	0.9932	0	0	0	0
0	0	0	0	0	0	0.9987
0	0	0	0.9984	0	0	0
0.9935	0	0	0	0.9963	0	0
0	0	0	0	0.9995	0	0
0	0	0	0.9980	0	0	0
0.9994	0	0	0	0	0.0001	0
0	0.9942	0	0	0	0	0.9721
0	0	0.9920	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9968	0.0022	0	0	0	0
0	0	0.9910	0.4020	0.5979	0.4003
0	0	0	0	0	0
0	0	0.9839	0	0	0
0	0	0	0.0010	0	0
0.9965	0	0	0	0.9964	0
0	0.0064	0	0	0	0.0029
0	0	0	0.0156	0	0
0	0.0018	0	0	0	0
0	0	0	0	0.9993	0
0	0	0.9776	0	0	0
0.6025	0	0	0	0	0.3959

r0 =

Columns 1 through 7

0.0113	0.9991	0.9878	0.0122	0	0	0
0	0	0	0	0.9986	0.9871	0.0119
0	0	0	0	0	0	0
0	0	0	0	0	0	0

0	0	0	0	0	0	0
0.4645	0	0	0	0.5355	0	0
0	0.9774	0	0	0	0.9773	0
0	0	0.9978	0	0	0	0.0020
0	0	0	0.0021	0	0	0
0	0	0	0	0	0	0
0.0154	0	0	0	0	0.9843	0
0	0.9997	0	0	0	0	0.0020
0	0	0.9993	0	0	0	0
0	0	0	0.0280	0	0	0
0	0	0	0	0.6025	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0131	0	0	0	0	0	0
0	0.0150	0.0153	0.0298	0.0298	0	0
0	0	0	0	0	0.9968	0.0010
0	0	0	0	0	0	0
0	0.0007	0	0	0	0.5355	0
0	0	0.0068	0	0	0	0
0	0	0	0	0	0	0.0013
0	0	0	0.0016	0	0	0
0.0065	0	0	0	0.0037	0	0
0	0	0	0	0.0005	0	0
0	0	0	0.0020	0	0	0
0.0006	0	0	0	0	0.9999	0
0	0.0058	0	0	0	0	0.0279
0	0	0.0080	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0032	0.9978	0	0	0	0
0	0	0.0090	0.5980	0.4021	0.5997
0	0	0	0	0	0
0	0	0.0161	0	0	0
0	0	0	0.9990	0	0
0.0035	0	0	0	0.0036	0
0	0.9936	0	0	0	0.9971
0	0	0	0.9844	0	0
0	0.9982	0	0	0	0
0	0	0	0	0.0007	0
0	0	0.0224	0	0	0
0.3975	0	0	0	0	0.6041

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 3

Variance 3.000000e-01

q0 =

Columns 1 through 7

0.0000	0	0	0	0	0.0000	0
1.0000	0	0	0	0	0	1.0000
1.0000	0	0	0	0	0	0
0.0000	0	0	0	0	0	0
0	0.9919	0	0	0	1.0000	0
0	1.0000	0	0	0	0	1.0000
0	0.0000	0	0	0	0	0
0	0.0000	0	0	0	0	0
0	0	0.0000	0	0	0.0001	0
0	0	0.0000	0	0	0	0.0001
0	0	0.0000	0	0	0	0
0	0	0.0000	0	0	0	0
0	0	0	1.0000	0	1.0000	0
0	0	0	0.0000	0	0	0
0	0	0	0.0000	0	0	0
0	0	0	1.0000	0	0	0
0	0	0	0	0.0002	0	0.0001
0	0	0	0	1.0000	0	0
0	0	0	0	0.0000	0	0
0	0	0	0	1.0000	0	0

Columns 8 through 14

0	0	0	0.0000	0	0	0
0	0	0	0	1.0000	0	0

1.0000	0	0	0	0	1.0000	0
0	0.0000	0	0	0	0	0.0000
0	0	0	0	0	0	0
0	0	0	1.0000	0	0	0
0.0000	0	0	0	0.0000	0	0
0	0	0.0000	0	0	0.0000	0
0	0	0	0	0	0	0.0000
0	0	0	0	0	0	0
0	0.0000	0	0	0.0000	0	0
0	0	0.0000	0.0002	0	0	0
0	0	0	0	0	1.0000	0
0.0000	0	0	0	0	0	0.0000
0	0.0000	0	0	0	0	0
0	0	1.0000	0	1.0000	0	0
0	0	0	0	0	0	0.0001
1.0000	0	0	1.0000	0	0	0
0	0.0000	0	0	0	0.0000	0
0	0	0.9968	0	0	0	0

Column 15

0
0
0
0
1.0000
0
0
0
0
0.0001
0
0
0
0
0.0000
0
0
0
0
1.0000

q1 =

Columns 1 through 7

1.0000	0	0	0	0	1.0000	0
0.0000	0	0	0	0	0	0.0000
0.0000	0	0	0	0	0	0
1.0000	0	0	0	0	0	0
0	0.0081	0	0	0	0.0000	0
0	0.0000	0	0	0	0	0.0000
0	1.0000	0	0	0	0	0
0	1.0000	0	0	0	0	0
0	0	1.0000	0	0	0.9999	0
0	0	1.0000	0	0	0	0.9999
0	0	1.0000	0	0	0	0
0	0	1.0000	0	0	0	0
0	0	0	0.0000	0	0.0000	0

0	0	0	1.0000	0	0	0
0	0	0	1.0000	0	0	0
0	0	0	0.0000	0	0	0
0	0	0	0	0.9998	0	0.9999
0	0	0	0	0.0000	0	0
0	0	0	0	1.0000	0	0
0	0	0	0	0.0000	0	0

Columns 8 through 14

0	0	0	1.0000	0	0	0
0	0	0	0	0.0000	0	0
0.0000	0	0	0	0	0.0000	0
0	1.0000	0	0	0	0	1.0000
0	0	0	0	0	0	0
0	0	0	0.0000	0	0	0
1.0000	0	0	0	1.0000	0	0
0	0	1.0000	0	0	1.0000	0
0	0	0	0	0	0	1.0000
0	0	0	0	0	0	0
0	1.0000	0	0	1.0000	0	0
0	0	1.0000	0.9998	0	0	0
0	0	0	0	0	0.0000	0
1.0000	0	0	0	0	0	1.0000
0	1.0000	0	0	0	0	0
0	0	0.0000	0	0.0000	0	0
0	0	0	0	0	0	0.9999
0.0000	0	0	0.0000	0	0	0
0	1.0000	0	0	0	1.0000	0
0	0	0.0032	0	0	0	0

Column 15

0
0
0
0
0.0000
0
0
0
0
0.9999
0
0
0
0
1.0000
0
0
0
0
0.0000

r1 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0	0	0
--------	--------	--------	--------	---	---	---

0	0	0	0	0.0000	0.0081	0.9919
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.9999	0	0	0	0.0001	0	0
0	0.0002	0	0	0	0.0002	0
0	0	0.0000	0	0	0	1.0000
0	0	0	1.0000	0	0	0
0	0	0	0	0	0	0
0.9998	0	0	0	0	0.0002	0
0	0.0000	0	0	0	0	1.0000
0	0	0.0000	0	0	0	0
0	0	0	0.9999	0	0	0
0	0	0	0	0.0001	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9919	0	0	0	0	0	0
0	1.0000	1.0000	1.0000	1.0000	0	0
0	0	0	0	0	0.0000	1.0000
0	0	0	0	0	0	0
0	1.0000	0	0	0	0.0001	0
0	0	0.9999	0	0	0	0
0	0	0	0	0	0	1.0000
0	0	0	1.0000	0	0	0
0.9968	0	0	0	0.9968	0	0
0	0	0	0	1.0000	0	0
0	0	0	1.0000	0	0	0
1.0000	0	0	0	0	0.0000	0
0	0.9999	0	0	0	0	0.9999
0	0	1.0000	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1.0000	0.0000	0	0	0	0
0	0	1.0000	0.0003	0.9997	0.0002
0	0	0	0	0	0
0	0	0.9999	0	0	0
0	0	0	0.0000	0	0
1.0000	0	0	0	1.0000	0
0	0.0032	0	0	0	0.0000
0	0	0	0.0002	0	0
0	0.0000	0	0	0	0
0	0	0	0	1.0000	0
0	0	1.0000	0	0	0
0.9999	0	0	0	0	0.0001

r0 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	0	0	0
0	0	0	0	1.0000	0.9919	0.0081
0	0	0	0	0	0	0
0	0	0	0	0	0	0

0	0	0	0	0	0	0
0.0001	0	0	0	0.9999	0	0
0	0.9998	0	0	0	0.9998	0
0	0	1.0000	0	0	0	0.0000
0	0	0	0.0000	0	0	0
0	0	0	0	0	0	0
0.0002	0	0	0	0	0.9998	0
0	1.0000	0	0	0	0	0.0000
0	0	1.0000	0	0	0	0
0	0	0	0.0001	0	0	0
0	0	0	0	0.9999	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0081	0	0	0	0	0	0
0	0.0000	0.0000	0.0000	0.0000	0	0
0	0	0	0	0	1.0000	0.0000
0	0	0	0	0	0	0
0	0.0000	0	0	0	0.9999	0
0	0	0.0001	0	0	0	0
0	0	0	0	0	0	0.0000
0	0	0	0.0000	0	0	0
0.0032	0	0	0	0.0032	0	0
0	0	0	0	0.0000	0	0
0	0	0	0.0000	0	0	0
0.0000	0	0	0	0	1.0000	0
0	0.0001	0	0	0	0	0.0001
0	0	0.0000	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0000	1.0000	0	0	0	0
0	0	0.0000	0.9997	0.0003	0.9998
0	0	0	0	0	0
0	0	0.0001	0	0	0
0	0	0	1.0000	0	0
0.0000	0	0	0	0.0000	0
0	0.9968	0	0	0	1.0000
0	0	0	0.9998	0	0
0	1.0000	0	0	0	0
0	0	0	0	0.0000	0
0	0	0.0000	0	0	0
0.0001	0	0	0	0	0.9999

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

It took 3 number of iterations

p =

Columns 1 through 7

0.0034	0.5906	0.9986	0.0105	0.9604	0.9990	0.0423
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0063	0.5206	0.4442	0.0135	0.5872	0.9832	0.1754
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0054	0.9944	0.4223	0.9939	0.0058	0.9755
--------	--------	--------	--------	--------	--------

Iteration number 1

Variance 4.000000e-01

q0 =

Columns 1 through 7

0.0034	0	0	0	0	0.0034	0
0.5906	0	0	0	0	0	0.5906
0.9986	0	0	0	0	0	0
0.0105	0	0	0	0	0	0
0	0.9604	0	0	0	0.9604	0
0	0.9990	0	0	0	0	0.9990
0	0.0423	0	0	0	0	0
0	0.0063	0	0	0	0	0
0	0	0.5206	0	0	0.5206	0



0	0	0.4442	0	0	0	0.4442
0	0	0.0135	0	0	0	0
0	0	0.5872	0	0	0	0
0	0	0	0.9832	0	0.9832	0
0	0	0	0.1754	0	0	0
0	0	0	0.0054	0	0	0
0	0	0	0.9944	0	0	0
0	0	0	0	0.4223	0	0.4223
0	0	0	0	0.9939	0	0
0	0	0	0	0.0058	0	0
0	0	0	0	0.9755	0	0

Columns 8 through 14

0	0	0	0.0034	0	0	0
0	0	0	0	0.5906	0	0
0.9986	0	0	0	0	0.9986	0
0	0.0105	0	0	0	0	0.0105
0	0	0	0	0	0	0
0	0	0	0.9990	0	0	0
0.0423	0	0	0	0.0423	0	0
0	0	0.0063	0	0	0.0063	0
0	0	0	0	0	0	0.5206
0	0	0	0	0	0	0
0	0.0135	0	0	0.0135	0	0
0	0	0.5872	0.5872	0	0	0
0	0	0	0	0	0.9832	0
0.1754	0	0	0	0	0	0.1754
0	0.0054	0	0	0	0	0
0	0	0.9944	0	0.9944	0	0
0	0	0	0	0	0	0.4223
0.9939	0	0	0.9939	0	0	0
0	0.0058	0	0	0	0.0058	0
0	0	0.9755	0	0	0	0

Column 15

0
0
0
0
0.9604
0
0
0
0
0.4442
0
0
0
0
0.0054
0
0
0
0
0.9755

q1 =

Columns 1 through 7

0.9966	0	0	0	0	0.9966	0
0.4094	0	0	0	0	0	0.4094
0.0014	0	0	0	0	0	0
0.9895	0	0	0	0	0	0
0	0.0396	0	0	0	0.0396	0
0	0.0010	0	0	0	0	0.0010
0	0.9577	0	0	0	0	0
0	0.9937	0	0	0	0	0
0	0	0.4794	0	0	0.4794	0
0	0	0.5558	0	0	0	0.5558
0	0	0.9865	0	0	0	0
0	0	0.4128	0	0	0	0
0	0	0	0.0168	0	0.0168	0
0	0	0	0.8246	0	0	0
0	0	0	0.9946	0	0	0
0	0	0	0.0056	0	0	0
0	0	0	0	0.5777	0	0.5777
0	0	0	0	0.0061	0	0
0	0	0	0	0.9942	0	0
0	0	0	0	0.0245	0	0

Columns 8 through 14

0	0	0	0.9966	0	0	0
0	0	0	0	0.4094	0	0
0.0014	0	0	0	0	0.0014	0
0	0.9895	0	0	0	0	0.9895
0	0	0	0	0	0	0
0	0	0	0.0010	0	0	0
0.9577	0	0	0	0.9577	0	0
0	0	0.9937	0	0	0.9937	0
0	0	0	0	0	0	0.4794
0	0	0	0	0	0	0
0	0.9865	0	0	0.9865	0	0
0	0	0.4128	0.4128	0	0	0
0	0	0	0	0	0.0168	0
0.8246	0	0	0	0	0	0.8246
0	0.9946	0	0	0	0	0
0	0	0.0056	0	0.0056	0	0
0	0	0	0	0	0	0.5777
0.0061	0	0	0.0061	0	0	0
0	0.9942	0	0	0	0.9942	0
0	0	0.0245	0	0	0	0

Column 15

0  
0  
0  
0  
0.0396  
0  
0  
0  
0  
0  
0.5558  
0

0  
0  
0  
0.9946  
0  
0  
0  
0  
0.0245

r1 =

Columns 1 through 7

0.5885	0.0152	0.4119	0.5897	0	0	0
0	0	0	0	0.0490	0.0839	0.9536
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4817	0	0	0	0.5198	0	0
0	0.4913	0	0	0	0.4984	0
0	0	0.2065	0	0	0	0.8197
0	0	0	0.9757	0	0	0
0	0	0	0	0	0	0
0.4140	0	0	0	0	0.5856	0
0	0.0596	0	0	0	0	0.5872
0	0	0.0284	0	0	0	0
0	0	0	0.4979	0	0	0
0	0	0	0	0.4475	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9206	0	0	0	0	0	0
0	0.4905	0.5035	0.5004	0.4978	0	0
0	0	0	0	0	0.1825	0.9726
0	0	0	0	0	0	0
0	0.9419	0	0	0	0.5189	0
0	0	0.5141	0	0	0	0
0	0	0	0	0	0	0.9508
0	0	0	0.9786	0	0	0
0.4180	0	0	0	0.9642	0	0
0	0	0	0	0.9895	0	0
0	0	0	0.5820	0	0	0
0.9763	0	0	0	0	0.0134	0
0	0.5494	0	0	0	0	0.4969
0	0	0.9331	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.8102	0.1897	0	0	0	0
0	0	0.9643	0.4269	0.5730	0.4241
0	0	0	0	0	0
0	0	0.5101	0	0	0
0	0	0	0.2037	0	0
0.9708	0	0	0	0.9712	0

0	0.5819	0	0	0	0.5852
0	0	0	0.5865	0	0
0	0.4193	0	0	0	0
0	0	0	0	0.9757	0
0	0	0.4869	0	0	0
0.5488	0	0	0	0	0.4492

r0 =

Columns 1 through 7

0.4115	0.9848	0.5881	0.4103	0	0	0
0	0	0	0	0.9510	0.9161	0.0464
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5183	0	0	0	0.4802	0	0
0	0.5087	0	0	0	0.5016	0
0	0	0.7935	0	0	0	0.1803
0	0	0	0.0243	0	0	0
0	0	0	0	0	0	0
0.5860	0	0	0	0	0.4144	0
0	0.9404	0	0	0	0	0.4128
0	0	0.9716	0	0	0	0
0	0	0	0.5021	0	0	0
0	0	0	0	0.5525	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0794	0	0	0	0	0	0
0	0.5095	0.4965	0.4996	0.5022	0	0
0	0	0	0	0	0.8175	0.0274
0	0	0	0	0	0	0
0	0.0581	0	0	0	0.4811	0
0	0	0.4859	0	0	0	0
0	0	0	0	0	0	0.0492
0	0	0	0.0214	0	0	0
0.5820	0	0	0	0.0358	0	0
0	0	0	0	0.0105	0	0
0	0	0	0.4180	0	0	0
0.0237	0	0	0	0	0.9866	0
0	0.4506	0	0	0	0	0.5031
0	0	0.0669	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.1898	0.8103	0	0	0	0
0	0	0.0357	0.5731	0.4270	0.5759
0	0	0	0	0	0
0	0	0.4899	0	0	0
0	0	0	0.7963	0	0
0.0292	0	0	0	0.0288	0
0	0.4181	0	0	0	0.4148
0	0	0	0.4135	0	0
0	0.5807	0	0	0	0

0	0	0	0	0.0243	0
0	0	0.5131	0	0	0
0.4512	0	0	0	0	0.5508

Q0 =

Columns 1 through 7

0.9964	0.0007	0.0000	0.9998	0.0019	0.0001	0.9997
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	0.9460	0.9493	0.9998	0.9994	0.0001	0.9997
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0013	0.9733	0.0017	1.0000	0.0208
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0036	0.9993	1.0000	0.0002	0.9981	0.9999	0.0003
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0540	0.0507	0.0002	0.0006	0.9999	0.0003
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	0.9987	0.0267	0.9983	0.0000	0.9792
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 2  
Variance 4.000000e-01  
q0 =

Columns 1 through 7

0.0052	0	0	0	0	0.0034	0
0.9593	0	0	0	0	0	0.9993
1.0000	0	0	0	0	0	0
0.0003	0	0	0	0	0	0
0	0.9651	0	0	0	0.9983	0
0	0.9986	0	0	0	0	0.9999
0	0.0068	0	0	0	0	0
0	0.0002	0	0	0	0	0
0	0	0.0521	0	0	0.4805	0

0	0	0.0514	0	0	0	0.0535
0	0	0.0002	0	0	0	0
0	0	0.0006	0	0	0	0
0	0	0	0.9998	0	0.9999	0
0	0	0	0.0110	0	0	0
0	0	0	0.0001	0	0	0
0	0	0	0.9944	0	0	0
0	0	0	0	0.4252	0	0.0277
0	0	0	0	0.9978	0	0
0	0	0	0	0.0000	0	0
0	0	0	0	0.9719	0	0

Columns 8 through 14

0	0	0	0.0026	0	0	0
0	0	0	0	0.9898	0	0
1.0000	0	0	0	0	0.9997	0
0	0.0074	0	0	0	0	0.0002
0	0	0	0	0	0	0
0	0	0	0.9999	0	0	0
0.0015	0	0	0	0.0005	0	0
0	0	0.0000	0	0	0.0008	0
0	0	0	0	0	0	0.0651
0	0	0	0	0	0	0
0	0.0097	0	0	0.0003	0	0
0	0	0.0149	0.0505	0	0	0
0	0	0	0	0	0.9959	0
0.0060	0	0	0	0	0	0.0003
0	0.0010	0	0	0	0	0
0	0	0.9990	0	0.9982	0	0
0	0	0	0	0	0	0.0253
0.9936	0	0	0.9988	0	0	0
0	0.0001	0	0	0	0.0001	0
0	0	0.9851	0	0	0	0

Column 15

0
0
0
0
0.9977
0
0
0
0
0.4270
0
0
0
0
0.0000
0
0
0
0
0.9746

q1 =

Columns 1 through 7

0.9948	0	0	0	0	0.9966	0
0.0407	0	0	0	0	0	0.0007
0.0000	0	0	0	0	0	0
0.9997	0	0	0	0	0	0
0	0.0349	0	0	0	0.0017	0
0	0.0014	0	0	0	0	0.0001
0	0.9932	0	0	0	0	0
0	0.9998	0	0	0	0	0
0	0	0.9479	0	0	0.5195	0
0	0	0.9486	0	0	0	0.9465
0	0	0.9998	0	0	0	0
0	0	0.9994	0	0	0	0
0	0	0	0.0002	0	0.0001	0
0	0	0	0.9890	0	0	0
0	0	0	0.9999	0	0	0
0	0	0	0.0056	0	0	0
0	0	0	0	0.5748	0	0.9723
0	0	0	0	0.0022	0	0
0	0	0	0	1.0000	0	0
0	0	0	0	0.0281	0	0

Columns 8 through 14

0	0	0	0.9974	0	0	0
0	0	0	0	0.0102	0	0
0.0000	0	0	0	0	0.0003	0
0	0.9926	0	0	0	0	0.9998
0	0	0	0	0	0	0
0	0	0	0.0001	0	0	0
0.9985	0	0	0	0.9995	0	0
0	0	1.0000	0	0	0.9992	0
0	0	0	0	0	0	0.9349
0	0	0	0	0	0	0
0	0.9903	0	0	0.9997	0	0
0	0	0.9851	0.9495	0	0	0
0	0	0	0	0	0.0041	0
0.9940	0	0	0	0	0	0.9997
0	0.9990	0	0	0	0	0
0	0	0.0010	0	0.0018	0	0
0	0	0	0	0	0	0.9747
0.0064	0	0	0.0012	0	0	0
0	0.9999	0	0	0	0.9999	0
0	0	0.0149	0	0	0	0

Column 15

0
0
0
0
0.0023
0
0
0
0
0.5730
0

```

0
0
0
1.0000
0
0
0
0
0
0.0254

```

r1 =

Columns 1 through 7

```

0.9590    0.0054    0.0457    0.9546    0    0    0
0         0         0         0    0.0084    0.0414    0.9635
0         0         0         0    0         0         0
0         0         0         0    0         0         0
0         0         0         0    0         0         0
0.5194    0         0         0    0.4807    0         0
0         0.0784    0         0    0         0.0789    0
0         0         0.0139    0         0         0         0.9876
0         0         0         0.9892    0         0         0
0         0         0         0         0         0         0
0.9483    0         0         0         0         0.0539    0
0         0.0026    0         0         0         0         0.9877
0         0         0.0050    0         0         0         0
0         0         0         0.9126    0         0         0
0         0         0         0         0.4307    0         0

```

Columns 8 through 14

```

0         0         0         0         0         0         0
0.9574    0         0         0         0         0         0
0         0.9479    0.9472    0.9014    0.9017    0         0
0         0         0         0         0         0.0166    0.9940
0         0         0         0         0         0         0
0         0.9949    0         0         0         0.4807    0
0         0         0.9715    0         0         0         0
0         0         0         0         0         0         0.9920
0         0         0         0.9915    0         0         0
0.9698    0         0         0         0.9842    0         0
0         0         0         0         0.9962    0         0
0         0         0         0.9875    0         0         0
0.9955    0         0         0         0         0.0012    0
0         0.9742    0         0         0         0         0.9127
0         0         0.9724    0         0         0         0

```

Columns 15 through 20

```

0         0         0         0         0         0
0         0         0         0         0         0
0         0         0         0         0         0
0.9832    0.0114    0         0         0         0
0         0         0.9698    0.4294    0.5703    0.4255
0         0         0         0         0         0
0         0         0.9458    0         0         0
0         0         0         0.0075    0         0
0.9830    0         0         0         0.9821    0

```



0	0.0294	0	0	0	0.0159
0	0	0	0.0529	0	0
0	0.0110	0	0	0	0
0	0	0	0	0.9949	0
0	0	0.9345	0	0	0
0.5690	0	0	0	0	0.4273

r0 =

Columns 1 through 7

0.0410	0.9946	0.9543	0.0454	0	0	0
0	0	0	0	0.9916	0.9586	0.0365
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4806	0	0	0	0.5193	0	0
0	0.9216	0	0	0	0.9211	0
0	0	0.9861	0	0	0	0.0124
0	0	0	0.0108	0	0	0
0	0	0	0	0	0	0
0.0517	0	0	0	0	0.9461	0
0	0.9974	0	0	0	0	0.0123
0	0	0.9950	0	0	0	0
0	0	0	0.0874	0	0	0
0	0	0	0	0.5693	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0426	0	0	0	0	0	0
0	0.0521	0.0528	0.0986	0.0983	0	0
0	0	0	0	0	0.9834	0.0060
0	0	0	0	0	0	0
0	0.0051	0	0	0	0.5193	0
0	0	0.0285	0	0	0	0
0	0	0	0	0	0	0.0080
0	0	0	0.0085	0	0	0
0.0302	0	0	0	0.0158	0	0
0	0	0	0	0.0038	0	0
0	0	0	0.0125	0	0	0
0.0045	0	0	0	0	0.9988	0
0	0.0258	0	0	0	0	0.0873
0	0	0.0276	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0168	0.9886	0	0	0	0
0	0	0.0302	0.5706	0.4297	0.5745
0	0	0	0	0	0
0	0	0.0542	0	0	0
0	0	0	0.9925	0	0
0.0170	0	0	0	0.0179	0
0	0.9706	0	0	0	0.9841
0	0	0	0.9471	0	0
0	0.9890	0	0	0	0

0	0	0	0	0.0051	0
0	0	0.0655	0	0	0
0.4310	0	0	0	0	0.5727

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0002	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	0.9999	0.0000	1.0000	0.0002
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	0.9998	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0001	1.0000	0.0000	0.9998
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 3  
Variance 4.000000e-01  
q0 =

Columns 1 through 7

0.0002	0	0	0	0	0.0000	0
0.9998	0	0	0	0	0	1.0000
1.0000	0	0	0	0	0	0
0.0000	0	0	0	0	0	0
0	0.9719	0	0	0	0.9997	0
0	1.0000	0	0	0	0	1.0000
0	0.0000	0	0	0	0	0
0	0.0000	0	0	0	0	0
0	0	0.0001	0	0	0.0016	0

0	0	0.0007	0	0	0	0.0013
0	0	0.0000	0	0	0	0
0	0	0.0001	0	0	0	0
0	0	0	1.0000	0	1.0000	0
0	0	0	0.0002	0	0	0
0	0	0	0.0001	0	0	0
0	0	0	1.0000	0	0	0
0	0	0	0	0.0029	0	0.0016
0	0	0	0	1.0000	0	0
0	0	0	0	0.0000	0	0
0	0	0	0	0.9997	0	0

Columns 8 through 14

0	0	0	0.0001	0	0	0
0	0	0	0	0.9997	0	0
1.0000	0	0	0	0	1.0000	0
0	0.0000	0	0	0	0	0.0000
0	0	0	0	0	0	0
0	0	0	1.0000	0	0	0
0.0000	0	0	0	0.0000	0	0
0	0	0.0000	0	0	0.0000	0
0	0	0	0	0	0	0.0003
0	0	0	0	0	0	0
0	0.0000	0	0	0.0000	0	0
0	0	0.0006	0.0025	0	0	0
0	0	0	0	0	0.9997	0
0.0001	0	0	0	0	0	0.0000
0	0.0001	0	0	0	0	0
0	0	1.0000	0	1.0000	0	0
0	0	0	0	0	0	0.0013
0.9997	0	0	1.0000	0	0	0
0	0.0000	0	0	0	0.0001	0
0	0	0.9863	0	0	0	0

Column 15

0
0
0
0
0.9997
0
0
0
0
0.0013
0
0
0
0
0.0000
0
0
0
0
0.9997

q1 =

Columns 1 through 7

0.9998	0	0	0	0	1.0000	0
0.0002	0	0	0	0	0	0.0000
0.0000	0	0	0	0	0	0
1.0000	0	0	0	0	0	0
0	0.0281	0	0	0	0.0003	0
0	0.0000	0	0	0	0	0.0000
0	1.0000	0	0	0	0	0
0	1.0000	0	0	0	0	0
0	0	0.9999	0	0	0.9984	0
0	0	0.9993	0	0	0	0.9987
0	0	1.0000	0	0	0	0
0	0	0.9999	0	0	0	0
0	0	0	0.0000	0	0.0000	0
0	0	0	0.9998	0	0	0
0	0	0	0.9999	0	0	0
0	0	0	0.0000	0	0	0
0	0	0	0	0.9971	0	0.9984
0	0	0	0	0.0000	0	0
0	0	0	0	1.0000	0	0
0	0	0	0	0.0003	0	0

Columns 8 through 14

0	0	0	0.9999	0	0	0
0	0	0	0	0.0003	0	0
0.0000	0	0	0	0	0.0000	0
0	1.0000	0	0	0	0	1.0000
0	0	0	0	0	0	0
0	0	0	0.0000	0	0	0
1.0000	0	0	0	1.0000	0	0
0	0	1.0000	0	0	1.0000	0
0	0	0	0	0	0	0.9997
0	0	0	0	0	0	0
0	1.0000	0	0	1.0000	0	0
0	0	0.9994	0.9975	0	0	0
0	0	0	0	0	0.0003	0
0.9999	0	0	0	0	0	1.0000
0	0.9999	0	0	0	0	0
0	0	0.0000	0	0.0000	0	0
0	0	0	0	0	0	0.9987
0.0003	0	0	0.0000	0	0	0
0	1.0000	0	0	0	0.9999	0
0	0	0.0137	0	0	0	0

Column 15

0
0
0
0
0.0003
0
0
0
0
0.9987
0

```

0
0
0
1.0000
0
0
0
0
0
0.0003

```

r1 =

Columns 1 through 7

```

0.9998    0.0002    0.0003    0.9997    0    0    0
0         0         0         0    0.0000    0.0281    0.9719
0         0         0         0    0         0         0
0         0         0         0    0         0         0
0         0         0         0    0         0         0
0.9982    0         0         0    0.0016    0         0
0         0.0029    0         0    0         0.0029    0
0         0         0.0004    0         0         0         0.9996
0         0         0         0.9999    0         0         0
0         0         0         0         0         0         0
0.9975    0         0         0         0         0.0027    0
0         0.0000    0         0         0         0         0.9997
0         0         0.0004    0         0         0         0
0         0         0         0.9984    0         0         0
0         0         0         0         0.0016    0         0

```

Columns 8 through 14

```

0         0         0         0         0         0         0
0.9719    0         0         0         0         0         0
0         0.9992    0.9998    0.9991    0.9992    0         0
0         0         0         0         0         0.0002    0.9999
0         0         0         0         0         0         0
0         0.9997    0         0         0         0.0019    0
0         0         0.9984    0         0         0         0
0         0         0         0         0         0         0.9997
0         0         0         0.9999    0         0         0
0.9857    0         0         0         0.9863    0         0
0         0         0         0         0.9998    0         0
0         0         0         0.9997    0         0         0
0.9997    0         0         0         0         0.0001    0
0         0.9987    0         0         0         0         0.9984
0         0         0.9994    0         0         0         0

```

Columns 15 through 20

```

0         0         0         0         0         0
0         0         0         0         0         0
0         0         0         0         0         0
0.9998    0.0003    0         0         0         0
0         0         0.9997    0.0032    0.9968    0.0029
0         0         0         0         0         0
0         0         0.9987    0         0         0
0         0         0         0.0001    0         0
0.9999    0         0         0         0.9999    0

```

0	0.0143	0	0	0	0.0006
0	0	0	0.0026	0	0
0	0.0004	0	0	0	0
0	0	0	0	0.9997	0
0	0	0.9997	0	0	0
0.9981	0	0	0	0	0.0016

r0 =

Columns 1 through 7

0.0002	0.9998	0.9997	0.0003	0	0	0
0	0	0	0	1.0000	0.9719	0.0281
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.0018	0	0	0	0.9984	0	0
0	0.9971	0	0	0	0.9971	0
0	0	0.9996	0	0	0	0.0004
0	0	0	0.0001	0	0	0
0	0	0	0	0	0	0
0.0025	0	0	0	0	0.9973	0
0	1.0000	0	0	0	0	0.0003
0	0	0.9996	0	0	0	0
0	0	0	0.0016	0	0	0
0	0	0	0	0.9984	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0281	0	0	0	0	0	0
0	0.0008	0.0002	0.0009	0.0008	0	0
0	0	0	0	0	0.9998	0.0001
0	0	0	0	0	0	0
0	0.0003	0	0	0	0.9981	0
0	0	0.0016	0	0	0	0
0	0	0	0	0	0	0.0003
0	0	0	0.0001	0	0	0
0.0143	0	0	0	0.0137	0	0
0	0	0	0	0.0002	0	0
0	0	0	0.0003	0	0	0
0.0003	0	0	0	0	0.9999	0
0	0.0013	0	0	0	0	0.0016
0	0	0.0006	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0002	0.9997	0	0	0	0
0	0	0.0003	0.9968	0.0032	0.9971
0	0	0	0	0	0
0	0	0.0013	0	0	0
0	0	0	0.9999	0	0
0.0001	0	0	0	0.0001	0
0	0.9857	0	0	0	0.9994
0	0	0	0.9974	0	0
0	0.9996	0	0	0	0

0	0	0	0	0.0003	0
0	0	0.0003	0	0	0
0.0019	0	0	0	0	0.9984

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

It took 3 number of iterations

p =

Columns 1 through 7

0.0105	0.5728	0.9947	0.0257	0.9276	0.9960	0.0761
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0172	0.5165	0.4553	0.0312	0.5700	0.9629	0.2247
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0152	0.9844	0.4376	0.9833	0.0160	0.9501
--------	--------	--------	--------	--------	--------

Iteration number 1  
Variance 5.000000e-01  
q0 =

Columns 1 through 7

0.0105	0	0	0	0	0.0105	0
0.5728	0	0	0	0	0	0.5728
0.9947	0	0	0	0	0	0
0.0257	0	0	0	0	0	0
0	0.9276	0	0	0	0.9276	0
0	0.9960	0	0	0	0	0.9960
0	0.0761	0	0	0	0	0
0	0.0172	0	0	0	0	0
0	0	0.5165	0	0	0.5165	0
0	0	0.4553	0	0	0	0.4553
0	0	0.0312	0	0	0	0
0	0	0.5700	0	0	0	0
0	0	0	0.9629	0	0.9629	0
0	0	0	0.2247	0	0	0
0	0	0	0.0152	0	0	0
0	0	0	0.9844	0	0	0
0	0	0	0	0.4376	0	0.4376
0	0	0	0	0.9833	0	0
0	0	0	0	0.0160	0	0
0	0	0	0	0.9501	0	0

Columns 8 through 14

0	0	0	0.0105	0	0	0
0	0	0	0	0.5728	0	0
0.9947	0	0	0	0	0.9947	0
0	0.0257	0	0	0	0	0.0257
0	0	0	0	0	0	0
0	0	0	0.9960	0	0	0
0.0761	0	0	0	0.0761	0	0
0	0	0.0172	0	0	0.0172	0
0	0	0	0	0	0	0.5165
0	0	0	0	0	0	0
0	0.0312	0	0	0.0312	0	0
0	0	0.5700	0.5700	0	0	0
0	0	0	0	0	0.9629	0
0.2247	0	0	0	0	0	0.2247
0	0.0152	0	0	0	0	0
0	0	0.9844	0	0.9844	0	0
0	0	0	0	0	0	0.4376
0.9833	0	0	0.9833	0	0	0
0	0.0160	0	0	0	0.0160	0
0	0	0.9501	0	0	0	0

Column 15

0  
0  
0  
0  
0.9276  
0  
0



```

0
0
0.4553
0
0
0
0
0.0152
0
0
0
0
0.9501

```

q1 =

Columns 1 through 7

0.9895	0	0	0	0	0.9895	0
0.4272	0	0	0	0	0	0.4272
0.0053	0	0	0	0	0	0
0.9743	0	0	0	0	0	0
0	0.0724	0	0	0	0.0724	0
0	0.0040	0	0	0	0	0.0040
0	0.9239	0	0	0	0	0
0	0.9828	0	0	0	0	0
0	0	0.4835	0	0	0.4835	0
0	0	0.5447	0	0	0	0.5447
0	0	0.9688	0	0	0	0
0	0	0.4300	0	0	0	0
0	0	0	0.0371	0	0.0371	0
0	0	0	0.7753	0	0	0
0	0	0	0.9848	0	0	0
0	0	0	0.0156	0	0	0
0	0	0	0	0.5624	0	0.5624
0	0	0	0	0.0167	0	0
0	0	0	0	0.9840	0	0
0	0	0	0	0.0499	0	0

Columns 8 through 14

0	0	0	0.9895	0	0	0
0	0	0	0	0.4272	0	0
0.0053	0	0	0	0	0.0053	0
0	0.9743	0	0	0	0	0.9743
0	0	0	0	0	0	0
0	0	0	0.0040	0	0	0
0.9239	0	0	0	0.9239	0	0
0	0	0.9828	0	0	0.9828	0
0	0	0	0	0	0	0.4835
0	0	0	0	0	0	0
0	0.9688	0	0	0.9688	0	0
0	0	0.4300	0.4300	0	0	0
0	0	0	0	0	0.0371	0
0.7753	0	0	0	0	0	0.7753
0	0.9848	0	0	0	0	0
0	0	0.0156	0	0.0156	0	0
0	0	0	0	0	0	0.5624
0.0167	0	0	0.0167	0	0	0

0	0.9840	0	0	0	0.9840	0
0	0	0.0499	0	0	0	0

Column 15

0
0
0
0
0.0724
0
0
0
0
0.5447
0
0
0
0
0.9848
0
0
0
0
0.0499

r1 =

Columns 1 through 7

0.5683	0.0405	0.4324	0.5705	0	0	0
0	0	0	0	0.0940	0.1500	0.9096
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4869	0	0	0	0.5149	0	0
0	0.4945	0	0	0	0.4992	0
0	0	0.2744	0	0	0	0.7633
0	0	0	0.9401	0	0	0
0	0	0	0	0	0	0
0.4329	0	0	0	0	0.5663	0
0	0.1150	0	0	0	0	0.5661
0	0	0.0673	0	0	0	0
0	0	0	0.4989	0	0	0
0	0	0	0	0.4610	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.8595	0	0	0	0	0	0
0	0.4941	0.5022	0.5002	0.4986	0	0
0	0	0	0	0	0.2414	0.9348
0	0	0	0	0	0	0
0	0.8875	0	0	0	0.5138	0
0	0	0.5090	0	0	0	0
0	0	0	0	0	0	0.9054
0	0	0	0.9452	0	0	0
0.4389	0	0	0	0.9211	0	0
0	0	0	0	0.9693	0	0

0	0	0	0.5598	0	0	0
0.9434	0	0	0	0	0.0375	0
0	0.5326	0	0	0	0	0.4980
0	0	0.8732	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.7469	0.2529	0	0	0	0
0	0	0.9212	0.4456	0.5543	0.4416
0	0	0	0	0	0
0	0	0.5065	0	0	0
0	0	0	0.2691	0	0
0.9305	0	0	0	0.9312	0
0	0.5609	0	0	0	0.5655
0	0	0	0.5680	0	0
0	0.4422	0	0	0	0
0	0	0	0	0.9423	0
0	0	0.4914	0	0	0
0.5344	0	0	0	0	0.4630

r0 =

Columns 1 through 7

0.4317	0.9595	0.5676	0.4295	0	0	0
0	0	0	0	0.9060	0.8500	0.0904
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5131	0	0	0	0.4851	0	0
0	0.5055	0	0	0	0.5008	0
0	0	0.7256	0	0	0	0.2367
0	0	0	0.0599	0	0	0
0	0	0	0	0	0	0
0.5671	0	0	0	0	0.4337	0
0	0.8850	0	0	0	0	0.4339
0	0	0.9327	0	0	0	0
0	0	0	0.5011	0	0	0
0	0	0	0	0.5390	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.1405	0	0	0	0	0	0
0	0.5059	0.4978	0.4998	0.5014	0	0
0	0	0	0	0	0.7586	0.0652
0	0	0	0	0	0	0
0	0.1125	0	0	0	0.4862	0
0	0	0.4910	0	0	0	0
0	0	0	0	0	0	0.0946
0	0	0	0.0548	0	0	0
0.5611	0	0	0	0.0789	0	0
0	0	0	0	0.0307	0	0
0	0	0	0.4402	0	0	0
0.0566	0	0	0	0	0.9625	0
0	0.4674	0	0	0	0	0.5020

0	0	0.1268	0	0	0	0
---	---	--------	---	---	---	---

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.2531	0.7471	0	0	0	0
0	0	0.0788	0.5544	0.4457	0.5584
0	0	0	0	0	0
0	0	0.4935	0	0	0
0	0	0	0.7309	0	0
0.0695	0	0	0	0.0688	0
0	0.4391	0	0	0	0.4345
0	0	0	0.4320	0	0
0	0.5578	0	0	0	0
0	0	0	0	0.0577	0
0	0	0.5086	0	0	0
0.4656	0	0	0	0	0.5370

Q0 =

Columns 1 through 7

0.9890	0.0040	0.0001	0.9987	0.0073	0.0009	0.9981
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.9998	0.8916	0.8960	0.9985	0.9964	0.0005	0.9979
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.9997	0.0054	0.9371	0.0066	0.9999	0.0445
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0110	0.9960	0.9999	0.0013	0.9927	0.9991	0.0019
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0002	0.1084	0.1040	0.0015	0.0036	0.9995	0.0021
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0003	0.9946	0.0629	0.9934	0.0001	0.9555
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 2  
Variance 5.000000e-01  
q0 =

Columns 1 through 7

0.0144	0	0	0	0	0.0104	0
0.9134	0	0	0	0	0	0.9959
0.9999	0	0	0	0	0	0
0.0017	0	0	0	0	0	0
0	0.9338	0	0	0	0.9931	0
0	0.9947	0	0	0	0	0.9991
0	0.0192	0	0	0	0	0
0	0.0013	0	0	0	0	0
0	0	0.1062	0	0	0.4897	0
0	0	0.1048	0	0	0	0.1074
0	0	0.0015	0	0	0	0
0	0	0.0036	0	0	0	0
0	0	0	0.9984	0	0.9995	0
0	0	0	0.0296	0	0	0
0	0	0	0.0010	0	0	0
0	0	0	0.9842	0	0	0
0	0	0	0	0.4398	0	0.0645
0	0	0	0	0.9918	0	0
0	0	0	0	0.0001	0	0
0	0	0	0	0.9444	0	0

Columns 8 through 14

0	0	0	0.0084	0	0	0
0	0	0	0	0.9701	0	0
0.9997	0	0	0	0	0.9985	0
0	0.0195	0	0	0	0	0.0013
0	0	0	0	0	0	0
0	0	0	0.9993	0	0	0
0.0062	0	0	0	0.0025	0	0
0	0	0.0002	0	0	0.0036	0
0	0	0	0	0	0	0.1217
0	0	0	0	0	0	0
0	0.0247	0	0	0.0019	0	0
0	0	0.0405	0.1025	0	0	0
0	0	0	0	0	0.9872	0
0.0200	0	0	0	0	0	0.0021
0	0.0045	0	0	0	0	0
0	0	0.9958	0	0.9932	0	0
0	0	0	0	0	0	0.0609
0.9824	0	0	0.9950	0	0	0
0	0.0008	0	0	0	0.0010	0
0	0	0.9654	0	0	0	0

Column 15

0
0
0
0
0.9915
0
0

```

0
0
0.4443
0
0
0
0
0.0004
0
0
0
0
0.9487

```

q1 =

Columns 1 through 7

```

0.9856      0      0      0      0      0.9896      0
0.0866      0      0      0      0      0      0.0041
0.0001      0      0      0      0      0      0
0.9983      0      0      0      0      0      0
0      0.0662      0      0      0      0.0069      0
0      0.0053      0      0      0      0      0.0009
0      0.9808      0      0      0      0      0
0      0.9987      0      0      0      0      0
0      0      0.8938      0      0      0.5103      0
0      0      0.8952      0      0      0      0.8926
0      0      0.9985      0      0      0      0
0      0      0.9964      0      0      0      0
0      0      0      0.0016      0      0.0005      0
0      0      0      0.9704      0      0      0
0      0      0      0.9990      0      0      0
0      0      0      0.0158      0      0      0
0      0      0      0      0.5602      0      0.9355
0      0      0      0      0.0082      0      0
0      0      0      0      0.9999      0      0
0      0      0      0      0.0556      0      0

```

Columns 8 through 14

```

0      0      0      0.9916      0      0      0
0      0      0      0      0.0299      0      0
0.0003      0      0      0      0      0.0015      0
0      0.9805      0      0      0      0      0.9987
0      0      0      0      0      0      0
0      0      0      0.0007      0      0      0
0.9938      0      0      0      0.9975      0      0
0      0      0.9998      0      0      0.9964      0
0      0      0      0      0      0      0.8783
0      0      0      0      0      0      0
0      0.9753      0      0      0.9981      0      0
0      0      0.9595      0.8975      0      0      0
0      0      0      0      0      0.0128      0
0.9800      0      0      0      0      0      0.9979
0      0.9955      0      0      0      0      0
0      0      0.0042      0      0.0068      0      0
0      0      0      0      0      0      0.9391
0.0176      0      0      0.0050      0      0      0

```

0	0.9992	0	0	0	0.9990	0
0	0	0.0346	0	0	0	0

Column 15

0
0
0
0
0.0085
0
0
0
0
0.5557
0
0
0
0
0.9996
0
0
0
0
0.0513

r1 =

Columns 1 through 7

0.9119	0.0162	0.0999	0.9014	0	0	0
0	0	0	0	0.0255	0.0840	0.9281
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5101	0	0	0	0.4900	0	0
0	0.1586	0	0	0	0.1608	0
0	0	0.0427	0	0	0	0.9628
0	0	0	0.9703	0	0	0
0	0	0	0	0	0	0
0.8930	0	0	0	0	0.1131	0
0	0.0111	0	0	0	0	0.9620
0	0	0.0173	0	0	0	0
0	0	0	0.8308	0	0	0
0	0	0	0	0.4500	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9127	0	0	0	0	0	0
0	0.8912	0.8898	0.8091	0.8104	0	0
0	0	0	0	0	0.0454	0.9817
0	0	0	0	0	0	0
0	0.9824	0	0	0	0.4901	0
0	0	0.9312	0	0	0	0
0	0	0	0	0	0	0.9761
0	0	0	0.9753	0	0	0
0.9241	0	0	0	0.9613	0	0
0	0	0	0	0.9860	0	0

0	0	0	0.9613	0	0	0
0.9848	0	0	0	0	0.0061	0
0	0.9361	0	0	0	0	0.8314
0	0	0.9407	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9541	0.0321	0	0	0	0
0	0	0.9371	0.4465	0.5527	0.4408
0	0	0	0	0	0
0	0	0.8887	0	0	0
0	0	0	0.0262	0	0
0.9560	0	0	0	0.9526	0
0	0.0724	0	0	0	0.0445
0	0	0	0.1097	0	0
0	0.0340	0	0	0	0
0	0	0	0	0.9822	0
0	0	0.8757	0	0	0
0.5492	0	0	0	0	0.4453

r0 =

Columns 1 through 7

0.0881	0.9838	0.9001	0.0986	0	0	0
0	0	0	0	0.9745	0.9160	0.0719
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4899	0	0	0	0.5100	0	0
0	0.8414	0	0	0	0.8392	0
0	0	0.9573	0	0	0	0.0372
0	0	0	0.0297	0	0	0
0	0	0	0	0	0	0
0.1070	0	0	0	0	0.8869	0
0	0.9889	0	0	0	0	0.0380
0	0	0.9827	0	0	0	0
0	0	0	0.1692	0	0	0
0	0	0	0	0.5500	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0873	0	0	0	0	0	0
0	0.1088	0.1102	0.1909	0.1896	0	0
0	0	0	0	0	0.9546	0.0183
0	0	0	0	0	0	0
0	0.0176	0	0	0	0.5099	0
0	0	0.0688	0	0	0	0
0	0	0	0	0	0	0.0239
0	0	0	0.0247	0	0	0
0.0759	0	0	0	0.0387	0	0
0	0	0	0	0.0140	0	0
0	0	0	0.0387	0	0	0
0.0152	0	0	0	0	0.9939	0
0	0.0639	0	0	0	0	0.1686



0	0	0.0593	0	0	0	0
---	---	--------	---	---	---	---

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0459	0.9679	0	0	0	0
0	0	0.0629	0.5535	0.4473	0.5592
0	0	0	0	0	0
0	0	0.1113	0	0	0
0	0	0	0.9738	0	0
0.0440	0	0	0	0.0474	0
0	0.9276	0	0	0	0.9555
0	0	0	0.8903	0	0
0	0.9660	0	0	0	0
0	0	0	0	0.0178	0
0	0	0.1243	0	0	0
0.4508	0	0	0	0	0.5547

Q0 =

Columns 1 through 7

0.9999	0.0000	0.0000	1.0000	0.0016	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	0.9998	0.9995	1.0000	0.9998	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	0.9991	0.0000	1.0000	0.0015
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0001	1.0000	1.0000	0.0000	0.9984	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0002	0.0005	0.0000	0.0002	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0009	1.0000	0.0000	0.9985
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 3  
Variance 5.000000e-01  
q0 =

Columns 1 through 7

0.0012	0	0	0	0	0.0001	0
0.9984	0	0	0	0	0	0.9999
1.0000	0	0	0	0	0	0
0.0002	0	0	0	0	0	0
0	0.9422	0	0	0	0.9983	0
0	0.9999	0	0	0	0	1.0000
0	0.0001	0	0	0	0	0
0	0.0000	0	0	0	0	0
0	0	0.0013	0	0	0.0088	0
0	0	0.0039	0	0	0	0.0065
0	0	0.0000	0	0	0	0
0	0	0.0008	0	0	0	0
0	0	0	0.9998	0	1.0000	0
0	0	0	0.0014	0	0	0
0	0	0	0.0006	0	0	0
0	0	0	1.0000	0	0	0
0	0	0	0	0.0136	0	0.0074
0	0	0	0	0.9999	0	0
0	0	0	0	0.0000	0	0
0	0	0	0	0.9980	0	0

Columns 8 through 14

0	0	0	0.0010	0	0	0
0	0	0	0	0.9977	0	0
1.0000	0	0	0	0	1.0000	0
0	0.0006	0	0	0	0	0.0001
0	0	0	0	0	0	0
0	0	0	0.9999	0	0	0
0.0003	0	0	0	0.0002	0	0
0	0	0.0000	0	0	0.0001	0
0	0	0	0	0	0	0.0023
0	0	0	0	0	0	0
0	0.0003	0	0	0.0002	0	0
0	0	0.0044	0.0123	0	0	0
0	0	0	0	0	0.9982	0
0.0011	0	0	0	0	0	0.0001
0	0.0006	0	0	0	0	0
0	0	1.0000	0	1.0000	0	0
0	0	0	0	0	0	0.0065
0.9983	0	0	0.9996	0	0	0
0	0.0002	0	0	0	0.0007	0
0	0	0.9679	0	0	0	0

Column 15

0
0
0
0
0.9980
0
0

```

0
0
0.0076
0
0
0
0
0.0000
0
0
0
0
0.9981

```

q1 =

Columns 1 through 7

```

0.9988      0      0      0      0      0.9999      0
0.0016      0      0      0      0      0      0.0001
0.0000      0      0      0      0      0      0
0.9998      0      0      0      0      0      0
0      0.0578      0      0      0      0.0017      0
0      0.0001      0      0      0      0      0.0000
0      0.9999      0      0      0      0      0
0      1.0000      0      0      0      0      0
0      0      0.9987      0      0      0.9912      0
0      0      0.9961      0      0      0      0.9935
0      0      1.0000      0      0      0      0
0      0      0.9992      0      0      0      0
0      0      0      0.0002      0      0.0000      0
0      0      0      0.9986      0      0      0
0      0      0      0.9994      0      0      0
0      0      0      0.0000      0      0      0
0      0      0      0      0.9864      0      0.9926
0      0      0      0      0.0001      0      0
0      0      0      0      1.0000      0      0
0      0      0      0      0.0020      0      0

```

Columns 8 through 14

```

0      0      0      0.9990      0      0      0
0      0      0      0      0.0023      0      0
0.0000      0      0      0      0      0.0000      0
0      0.9994      0      0      0      0      0.9999
0      0      0      0      0      0      0
0      0      0      0.0001      0      0      0
0.9997      0      0      0      0.9998      0      0
0      0      1.0000      0      0      0.9999      0
0      0      0      0      0      0      0.9977
0      0      0      0      0      0      0
0      0.9997      0      0      0.9998      0      0
0      0      0.9956      0.9877      0      0      0
0      0      0      0      0      0.0018      0
0.9989      0      0      0      0      0      0.9999
0      0.9994      0      0      0      0      0
0      0      0.0000      0      0.0000      0      0
0      0      0      0      0      0      0.9935
0.0017      0      0      0.0004      0      0      0

```

0	0.9998	0	0	0	0.9993	0
0	0	0.0321	0	0	0	0

Column 15

0
0
0
0
0.0020
0
0
0
0
0.9924
0
0
0
0
1.0000
0
0
0
0
0.0019

r1 =

Columns 1 through 7

0.9983	0.0014	0.0030	0.9972	0	0	0
0	0	0	0	0.0002	0.0580	0.9421
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.9895	0	0	0	0.0089	0	0
0	0.0138	0	0	0	0.0139	0
0	0	0.0030	0	0	0	0.9972
0	0	0	0.9988	0	0	0
0	0	0	0	0	0	0
0.9873	0	0	0	0	0.0136	0
0	0.0005	0	0	0	0	0.9975
0	0	0.0025	0	0	0	0
0	0	0	0.9911	0	0	0
0	0	0	0	0.0095	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9420	0	0	0	0	0	0
0	0.9953	0.9979	0.9941	0.9948	0	0
0	0	0	0	0	0.0021	0.9991
0	0	0	0	0	0	0
0	0.9982	0	0	0	0.0106	0
0	0	0.9925	0	0	0	0
0	0	0	0	0	0	0.9981
0	0	0	0.9986	0	0	0
0.9637	0	0	0	0.9678	0	0
0	0	0	0	0.9986	0	0

0	0	0	0.9974	0	0	0
0.9976	0	0	0	0	0.0008	0
0	0.9933	0	0	0	0	0.9911
0	0	0.9961	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9983	0.0022	0	0	0	0
0	0	0.9980	0.0156	0.9844	0.0137
0	0	0	0	0	0
0	0	0.9933	0	0	0
0	0	0	0.0014	0	0
0.9989	0	0	0	0.9985	0
0	0.0363	0	0	0	0.0044
0	0	0	0.0133	0	0
0	0.0027	0	0	0	0
0	0	0	0	0.9981	0
0	0	0.9974	0	0	0
0.9886	0	0	0	0	0.0096

r0 =

Columns 1 through 7

0.0017	0.9986	0.9970	0.0028	0	0	0
0	0	0	0	0.9998	0.9420	0.0579
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.0105	0	0	0	0.9911	0	0
0	0.9862	0	0	0	0.9861	0
0	0	0.9970	0	0	0	0.0028
0	0	0	0.0012	0	0	0
0	0	0	0	0	0	0
0.0127	0	0	0	0	0.9864	0
0	0.9995	0	0	0	0	0.0025
0	0	0.9975	0	0	0	0
0	0	0	0.0089	0	0	0
0	0	0	0	0.9905	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0580	0	0	0	0	0	0
0	0.0047	0.0021	0.0059	0.0052	0	0
0	0	0	0	0	0.9979	0.0009
0	0	0	0	0	0	0
0	0.0018	0	0	0	0.9894	0
0	0	0.0075	0	0	0	0
0	0	0	0	0	0	0.0019
0	0	0	0.0014	0	0	0
0.0363	0	0	0	0.0322	0	0
0	0	0	0	0.0014	0	0
0	0	0	0.0026	0	0	0
0.0024	0	0	0	0	0.9992	0
0	0.0067	0	0	0	0	0.0089

0	0	0.0039	0	0	0	0
---	---	--------	---	---	---	---

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0017	0.9978	0	0	0	0
0	0	0.0020	0.9844	0.0156	0.9863
0	0	0	0	0	0
0	0	0.0067	0	0	0
0	0	0	0.9986	0	0
0.0011	0	0	0	0.0015	0
0	0.9637	0	0	0	0.9956
0	0	0	0.9867	0	0
0	0.9973	0	0	0	0
0	0	0	0	0.0019	0
0	0	0.0026	0	0	0
0.0114	0	0	0	0	0.9904

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

It took 3 number of iterations

p =

Columns 1 through 7

0.0221	0.5608	0.9874	0.0461	0.8933	0.9899	0.1111
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0332	0.5137	0.4627	0.0540	0.5585	0.9378	0.2627
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0300	0.9693	0.4479	0.9676	0.0312	0.9210
--------	--------	--------	--------	--------	--------

Iteration number 1

Variance 6.000000e-01

q0 =

Columns 1 through 7

0.0221	0	0	0	0	0.0221	0
0.5608	0	0	0	0	0	0.5608
0.9874	0	0	0	0	0	0
0.0461	0	0	0	0	0	0
0	0.8933	0	0	0	0.8933	0
0	0.9899	0	0	0	0	0.9899
0	0.1111	0	0	0	0	0
0	0.0332	0	0	0	0	0
0	0	0.5137	0	0	0.5137	0
0	0	0.4627	0	0	0	0.4627
0	0	0.0540	0	0	0	0
0	0	0.5585	0	0	0	0
0	0	0	0.9378	0	0.9378	0
0	0	0	0.2627	0	0	0
0	0	0	0.0300	0	0	0
0	0	0	0.9693	0	0	0
0	0	0	0	0.4479	0	0.4479
0	0	0	0	0.9676	0	0
0	0	0	0	0.0312	0	0
0	0	0	0	0.9210	0	0

Columns 8 through 14

0	0	0	0.0221	0	0	0
0	0	0	0	0.5608	0	0
0.9874	0	0	0	0	0.9874	0
0	0.0461	0	0	0	0	0.0461
0	0	0	0	0	0	0
0	0	0	0.9899	0	0	0
0.1111	0	0	0	0.1111	0	0
0	0	0.0332	0	0	0.0332	0
0	0	0	0	0	0	0.5137
0	0	0	0	0	0	0
0	0.0540	0	0	0.0540	0	0
0	0	0.5585	0.5585	0	0	0
0	0	0	0	0	0.9378	0
0.2627	0	0	0	0	0	0.2627

0	0.0300	0	0	0	0	0
0	0	0.9693	0	0.9693	0	0
0	0	0	0	0	0	0.4479
0.9676	0	0	0.9676	0	0	0
0	0.0312	0	0	0	0.0312	0
0	0	0.9210	0	0	0	0

Column 15

0
0
0
0
0.8933
0
0
0
0
0.4627
0
0
0
0
0.0300
0
0
0
0
0.9210

q1 =

Columns 1 through 7

0.9779	0	0	0	0	0.9779	0
0.4392	0	0	0	0	0	0.4392
0.0126	0	0	0	0	0	0
0.9539	0	0	0	0	0	0
0	0.1067	0	0	0	0.1067	0
0	0.0101	0	0	0	0	0.0101
0	0.8889	0	0	0	0	0
0	0.9668	0	0	0	0	0
0	0	0.4863	0	0	0.4863	0
0	0	0.5373	0	0	0	0.5373
0	0	0.9460	0	0	0	0
0	0	0.4415	0	0	0	0
0	0	0	0.0622	0	0.0622	0
0	0	0	0.7373	0	0	0
0	0	0	0.9700	0	0	0
0	0	0	0.0307	0	0	0
0	0	0	0	0.5521	0	0.5521
0	0	0	0	0.0324	0	0
0	0	0	0	0.9688	0	0
0	0	0	0	0.0790	0	0

Columns 8 through 14

0	0	0	0.9779	0	0	0
0	0	0	0	0.4392	0	0



0.0126	0	0	0	0	0.0126	0
0	0.9539	0	0	0	0	0.9539
0	0	0	0	0	0	0
0	0	0	0.0101	0	0	0
0.8889	0	0	0	0.8889	0	0
0	0	0.9668	0	0	0.9668	0
0	0	0	0	0	0	0.4863
0	0	0	0	0	0	0
0	0.9460	0	0	0.9460	0	0
0	0	0.4415	0.4415	0	0	0
0	0	0	0	0	0.0622	0
0.7373	0	0	0	0	0	0.7373
0	0.9700	0	0	0	0	0
0	0	0.0307	0	0.0307	0	0
0	0	0	0	0	0	0.5521
0.0324	0	0	0.0324	0	0	0
0	0.9688	0	0	0	0.9688	0
0	0	0.0790	0	0	0	0

Column 15

0
0
0
0
0.1067
0
0
0
0
0.5373
0
0
0
0
0.9700
0
0
0
0
0.0790

r1 =

Columns 1 through 7

0.5538	0.0771	0.4473	0.5566	0	0	0
0	0	0	0	0.1442	0.2143	0.8598
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4905	0	0	0	0.5115	0	0
0	0.4962	0	0	0	0.4995	0
0	0	0.3274	0	0	0	0.7163
0	0	0	0.8931	0	0	0
0	0	0	0	0	0	0
0.4464	0	0	0	0	0.5523	0
0	0.1743	0	0	0	0	0.5509
0	0	0.1168	0	0	0	0

0	0	0	0.4993	0	0	0
0	0	0	0	0.4705	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.7998	0	0	0	0	0	0
0	0.4961	0.5014	0.5001	0.4991	0	0
0	0	0	0	0	0.2906	0.8863
0	0	0	0	0	0	0
0	0.8292	0	0	0	0.5103	0
0	0	0.5062	0	0	0	0
0	0	0	0	0	0	0.8546
0	0	0	0.9000	0	0	0
0.4538	0	0	0	0.8690	0	0
0	0	0	0	0.9379	0	0
0	0	0	0.5444	0	0	0
0.9001	0	0	0	0	0.0733	0
0	0.5224	0	0	0	0	0.4987
0	0	0.8113	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.6950	0.3047	0	0	0	0
0	0	0.8691	0.4589	0.5410	0.4544
0	0	0	0	0	0
0	0	0.5044	0	0	0
0	0	0	0.3200	0	0
0.8796	0	0	0	0.8806	0
0	0.5460	0	0	0	0.5513
0	0	0	0.5548	0	0
0	0.4578	0	0	0	0
0	0	0	0	0.8985	0
0	0	0.4941	0	0	0
0.5247	0	0	0	0	0.4724

r0 =

Columns 1 through 7

0.4462	0.9229	0.5527	0.4434	0	0	0
0	0	0	0	0.8558	0.7857	0.1402
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5095	0	0	0	0.4885	0	0
0	0.5038	0	0	0	0.5005	0
0	0	0.6726	0	0	0	0.2837
0	0	0	0.1069	0	0	0
0	0	0	0	0	0	0
0.5536	0	0	0	0	0.4477	0
0	0.8257	0	0	0	0	0.4491
0	0	0.8832	0	0	0	0
0	0	0	0.5007	0	0	0
0	0	0	0	0.5295	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.2002	0	0	0	0	0	0
0	0.5039	0.4986	0.4999	0.5009	0	0
0	0	0	0	0	0.7094	0.1137
0	0	0	0	0	0	0
0	0.1708	0	0	0	0.4897	0
0	0	0.4938	0	0	0	0
0	0	0	0	0	0	0.1454
0	0	0	0.1000	0	0	0
0.5462	0	0	0	0.1310	0	0
0	0	0	0	0.0621	0	0
0	0	0	0.4556	0	0	0
0.0999	0	0	0	0	0.9267	0
0	0.4776	0	0	0	0	0.5013
0	0	0.1887	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.3050	0.6953	0	0	0	0
0	0	0.1309	0.5411	0.4590	0.5456
0	0	0	0	0	0
0	0	0.4956	0	0	0
0	0	0	0.6800	0	0
0.1204	0	0	0	0.1194	0
0	0.4540	0	0	0	0.4487
0	0	0	0.4452	0	0
0	0.5422	0	0	0	0
0	0	0	0	0.1015	0
0	0	0.5059	0	0	0
0.4753	0	0	0	0	0.5276

Q0 =

Columns 1 through 7

0.9771	0.0134	0.0007	0.9954	0.0184	0.0034	0.9935
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.9989	0.8319	0.8373	0.9947	0.9875	0.0022	0.9922
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.9983	0.0139	0.8905	0.0164	0.9996	0.0729
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0229	0.9866	0.9993	0.0046	0.9816	0.9966	0.0065
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0011	0.1681	0.1627	0.0053	0.0125	0.9978	0.0078
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0017	0.9861	0.1095	0.9836	0.0004	0.9271
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 2  
Variance 6.000000e-01  
q0 =

Columns 1 through 7

0.0283	0	0	0	0	0.0221	0
0.8599	0	0	0	0	0	0.9864
0.9992	0	0	0	0	0	0
0.0058	0	0	0	0	0	0
0	0.9000	0	0	0	0.9824	0
0	0.9876	0	0	0	0	0.9966
0	0.0388	0	0	0	0	0
0	0.0046	0	0	0	0	0
0	0	0.1660	0	0	0.4952	0
0	0	0.1635	0	0	0	0.1661
0	0	0.0053	0	0	0	0
0	0	0.0125	0	0	0	0
0	0	0	0.9946	0	0.9979	0
0	0	0	0.0574	0	0	0
0	0	0	0.0038	0	0	0
0	0	0	0.9689	0	0	0
0	0	0	0	0.4494	0	0.1112
0	0	0	0	0.9807	0	0
0	0	0	0	0.0005	0	0
0	0	0	0	0.9138	0	0

Columns 8 through 14

0	0	0	0.0186	0	0	0
0	0	0	0	0.9395	0	0
0.9986	0	0	0	0	0.9950	0
0	0.0372	0	0	0	0	0.0046
0	0	0	0	0	0	0
0	0	0	0.9972	0	0	0
0.0163	0	0	0	0.0080	0	0
0	0	0.0010	0	0	0.0102	0
0	0	0	0	0	0	0.1811
0	0	0	0	0	0	0
0	0.0456	0	0	0.0063	0	0
0	0	0.0775	0.1607	0	0	0
0	0	0	0	0	0.9725	0
0.0439	0	0	0	0	0	0.0077

0	0.0121	0	0	0	0	0
0	0	0.9884	0	0.9836	0	0
0	0	0	0	0	0	0.1072
0.9658	0	0	0.9868	0	0	0
0	0.0031	0	0	0	0.0037	0
0	0	0.9399	0	0	0	0

Column 15

0
0
0
0
0.9794
0
0
0
0
0.4552
0
0
0
0
0.0019
0
0
0
0
0.9193

q1 =

Columns 1 through 7

0.9717	0	0	0	0	0.9779	0
0.1401	0	0	0	0	0	0.0136
0.0008	0	0	0	0	0	0
0.9942	0	0	0	0	0	0
0	0.1000	0	0	0	0.0176	0
0	0.0124	0	0	0	0	0.0034
0	0.9612	0	0	0	0	0
0	0.9954	0	0	0	0	0
0	0	0.8340	0	0	0.5048	0
0	0	0.8365	0	0	0	0.8339
0	0	0.9947	0	0	0	0
0	0	0.9875	0	0	0	0
0	0	0	0.0054	0	0.0021	0
0	0	0	0.9426	0	0	0
0	0	0	0.9962	0	0	0
0	0	0	0.0311	0	0	0
0	0	0	0	0.5506	0	0.8888
0	0	0	0	0.0193	0	0
0	0	0	0	0.9995	0	0
0	0	0	0	0.0862	0	0

Columns 8 through 14

0	0	0	0.9814	0	0	0
0	0	0	0	0.0605	0	0

0.0014	0	0	0	0	0.0050	0
0	0.9628	0	0	0	0	0.9954
0	0	0	0	0	0	0
0	0	0	0.0028	0	0	0
0.9837	0	0	0	0.9920	0	0
0	0	0.9990	0	0	0.9898	0
0	0	0	0	0	0	0.8189
0	0	0	0	0	0	0
0	0.9544	0	0	0.9937	0	0
0	0	0.9225	0.8393	0	0	0
0	0	0	0	0	0.0275	0
0.9561	0	0	0	0	0	0.9923
0	0.9879	0	0	0	0	0
0	0	0.0116	0	0.0164	0	0
0	0	0	0	0	0	0.8928
0.0342	0	0	0.0132	0	0	0
0	0.9969	0	0	0	0.9963	0
0	0	0.0601	0	0	0	0

Column 15

0
0
0
0
0.0206
0
0
0
0
0.5448
0
0
0
0
0.9981
0
0
0
0
0.0807

r1 =

Columns 1 through 7

0.8552	0.0345	0.1644	0.8390	0	0	0
0	0	0	0	0.0543	0.1344	0.8865
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5046	0	0	0	0.4954	0	0
0	0.2421	0	0	0	0.2474	0
0	0	0.0890	0	0	0	0.9237
0	0	0	0.9407	0	0	0
0	0	0	0	0	0	0
0.8285	0	0	0	0	0.1819	0
0	0.0301	0	0	0	0	0.9197
0	0	0.0406	0	0	0	0

0	0	0	0.7467	0	0	0
0	0	0	0	0.4625	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.8599	0	0	0	0	0	0
0	0.8247	0.8223	0.7192	0.7225	0	0
0	0	0	0	0	0.0882	0.9602
0	0	0	0	0	0	0
0	0.9591	0	0	0	0.4956	0
0	0	0.8756	0	0	0	0
0	0	0	0	0	0	0.9494
0	0	0	0.9488	0	0	0
0.8631	0	0	0	0.9289	0	0
0	0	0	0	0.9661	0	0
0	0	0	0.9183	0	0	0
0.9643	0	0	0	0	0.0187	0
0	0.8832	0	0	0	0	0.7483
0	0	0.9005	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9105	0.0656	0	0	0	0
0	0	0.8974	0.4582	0.5403	0.4514
0	0	0	0	0	0
0	0	0.8226	0	0	0
0	0	0	0.0600	0	0
0.9181	0	0	0	0.9105	0
0	0.1290	0	0	0	0.0881
0	0	0	0.1751	0	0
0	0.0730	0	0	0	0
0	0	0	0	0.9582	0
0	0	0.8111	0	0	0
0.5361	0	0	0	0	0.4572

r0 =

Columns 1 through 7

0.1448	0.9655	0.8356	0.1610	0	0	0
0	0	0	0	0.9457	0.8656	0.1135
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4954	0	0	0	0.5046	0	0
0	0.7579	0	0	0	0.7526	0
0	0	0.9110	0	0	0	0.0763
0	0	0	0.0593	0	0	0
0	0	0	0	0	0	0
0.1715	0	0	0	0	0.8181	0
0	0.9699	0	0	0	0	0.0803
0	0	0.9594	0	0	0	0
0	0	0	0.2533	0	0	0
0	0	0	0	0.5375	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.1401	0	0	0	0	0	0
0	0.1753	0.1777	0.2808	0.2775	0	0
0	0	0	0	0	0.9118	0.0398
0	0	0	0	0	0	0
0	0.0409	0	0	0	0.5044	0
0	0	0.1244	0	0	0	0
0	0	0	0	0	0	0.0506
0	0	0	0.0512	0	0	0
0.1369	0	0	0	0.0711	0	0
0	0	0	0	0.0339	0	0
0	0	0	0.0817	0	0	0
0.0357	0	0	0	0	0.9813	0
0	0.1168	0	0	0	0	0.2517
0	0	0.0995	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0895	0.9344	0	0	0	0
0	0	0.1026	0.5418	0.4597	0.5486
0	0	0	0	0	0
0	0	0.1774	0	0	0
0	0	0	0.9400	0	0
0.0819	0	0	0	0.0895	0
0	0.8710	0	0	0	0.9119
0	0	0	0.8249	0	0
0	0.9270	0	0	0	0
0	0	0	0	0.0418	0
0	0	0.1889	0	0	0
0.4639	0	0	0	0	0.5428

Q0 =

Columns 1 through 7

0.9992	0.0003	0.0000	0.9998	0.0058	0.0001	0.9999
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	0.9987	0.9971	0.9999	0.9987	0.0001	0.9997
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.9998	0.0000	0.9954	0.0004	0.9999	0.0057
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0008	0.9997	1.0000	0.0002	0.9942	0.9999	0.0001
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14



0.0000	0.0013	0.0029	0.0001	0.0013	0.9999	0.0003
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0002	1.0000	0.0046	0.9996	0.0001	0.9943
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 3  
Variance 6.000000e-01  
q0 =

Columns 1 through 7

0.0046	0	0	0	0	0.0008	0
0.9923	0	0	0	0	0	0.9991
0.9999	0	0	0	0	0	0
0.0010	0	0	0	0	0	0
0	0.9083	0	0	0	0.9941	0
0	0.9993	0	0	0	0	0.9996
0	0.0009	0	0	0	0	0
0	0.0002	0	0	0	0	0
0	0	0.0059	0	0	0.0288	0
0	0	0.0133	0	0	0	0.0201
0	0	0.0003	0	0	0	0
0	0	0.0034	0	0	0	0
0	0	0	0.9988	0	0.9999	0
0	0	0	0.0064	0	0	0
0	0	0	0.0024	0	0	0
0	0	0	0.9996	0	0	0
0	0	0	0	0.0391	0	0.0211
0	0	0	0	0.9995	0	0
0	0	0	0	0.0001	0	0
0	0	0	0	0.9931	0	0

Columns 8 through 14

0	0	0	0.0037	0	0	0
0	0	0	0	0.9911	0	0
0.9999	0	0	0	0	0.9998	0
0	0.0031	0	0	0	0	0.0006
0	0	0	0	0	0	0
0	0	0	0.9995	0	0	0
0.0014	0	0	0	0.0013	0	0
0	0	0.0002	0	0	0.0009	0
0	0	0	0	0	0	0.0095
0	0	0	0	0	0	0
0	0.0020	0	0	0.0012	0	0
0	0	0.0168	0.0359	0	0	0
0	0	0	0	0	0.9937	0
0.0049	0	0	0	0	0	0.0008

0	0.0026	0	0	0	0	0
0	0	0.9998	0	0.9997	0	0
0	0	0	0	0	0	0.0196
0.9940	0	0	0.9982	0	0	0
0	0.0012	0	0	0	0.0027	0
0	0	0.9439	0	0	0	0

Column 15

0
0
0
0
0.9933
0
0
0
0
0.0258
0
0
0
0
0.0003
0
0
0
0
0.9932

q1 =

Columns 1 through 7

0.9954	0	0	0	0	0.9992	0
0.0077	0	0	0	0	0	0.0009
0.0001	0	0	0	0	0	0
0.9990	0	0	0	0	0	0
0	0.0917	0	0	0	0.0059	0
0	0.0007	0	0	0	0	0.0004
0	0.9991	0	0	0	0	0
0	0.9998	0	0	0	0	0
0	0	0.9941	0	0	0.9712	0
0	0	0.9867	0	0	0	0.9799
0	0	0.9997	0	0	0	0
0	0	0.9966	0	0	0	0
0	0	0	0.0012	0	0.0001	0
0	0	0	0.9936	0	0	0
0	0	0	0.9976	0	0	0
0	0	0	0.0004	0	0	0
0	0	0	0	0.9609	0	0.9789
0	0	0	0	0.0005	0	0
0	0	0	0	0.9999	0	0
0	0	0	0	0.0069	0	0

Columns 8 through 14

0	0	0	0.9963	0	0	0
0	0	0	0	0.0089	0	0

0.0001	0	0	0	0	0.0002	0
0	0.9969	0	0	0	0	0.9994
0	0	0	0	0	0	0
0	0	0	0.0005	0	0	0
0.9986	0	0	0	0.9987	0	0
0	0	0.9998	0	0	0.9991	0
0	0	0	0	0	0	0.9905
0	0	0	0	0	0	0
0	0.9980	0	0	0.9988	0	0
0	0	0.9832	0.9641	0	0	0
0	0	0	0	0	0.0063	0
0.9951	0	0	0	0	0	0.9992
0	0.9974	0	0	0	0	0
0	0	0.0002	0	0.0003	0	0
0	0	0	0	0	0	0.9804
0.0060	0	0	0.0018	0	0	0
0	0.9988	0	0	0	0.9973	0
0	0	0.0561	0	0	0	0

Column 15

0
0
0
0
0.0067
0
0
0
0
0.9742
0
0
0
0
0.9997
0
0
0
0
0.0068

r1 =

Columns 1 through 7

0.9912	0.0056	0.0132	0.9877	0	0	0
0	0	0	0	0.0018	0.0926	0.9076
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.9655	0	0	0	0.0297	0	0
0	0.0408	0	0	0	0.0412	0
0	0	0.0122	0	0	0	0.9890
0	0	0	0.9942	0	0	0
0	0	0	0	0	0	0
0.9620	0	0	0	0	0.0410	0
0	0.0028	0	0	0	0	0.9896
0	0	0.0098	0	0	0	0

0	0	0	0.9705	0	0	0
0	0	0	0	0.0324	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.9070	0	0	0	0	0	0
0	0.9831	0.9905	0.9777	0.9806	0	0
0	0	0	0	0	0.0091	0.9960
0	0	0	0	0	0	0
0	0.9932	0	0	0	0.0351	0
0	0	0.9777	0	0	0	0
0	0	0	0	0	0	0.9925
0	0	0	0.9931	0	0	0
0.9289	0	0	0	0.9436	0	0
0	0	0	0	0.9939	0	0
0	0	0	0.9895	0	0	0
0.9908	0	0	0	0	0.0038	0
0	0.9791	0	0	0	0	0.9707
0	0	0.9864	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9921	0.0099	0	0	0	0
0	0	0.9925	0.0457	0.9541	0.0397
0	0	0	0	0	0
0	0	0.9787	0	0	0
0	0	0	0.0064	0	0
0.9937	0	0	0	0.9923	0
0	0.0712	0	0	0	0.0171
0	0	0	0.0398	0	0
0	0.0113	0	0	0	0
0	0	0	0	0.9926	0
0	0	0.9892	0	0	0
0.9616	0	0	0	0	0.0324

r0 =

Columns 1 through 7

0.0088	0.9944	0.9868	0.0123	0	0	0
0	0	0	0	0.9982	0.9074	0.0924
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.0345	0	0	0	0.9703	0	0
0	0.9592	0	0	0	0.9588	0
0	0	0.9878	0	0	0	0.0110
0	0	0	0.0058	0	0	0
0	0	0	0	0	0	0
0.0380	0	0	0	0	0.9590	0
0	0.9972	0	0	0	0	0.0104
0	0	0.9902	0	0	0	0
0	0	0	0.0295	0	0	0
0	0	0	0	0.9676	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.0930	0	0	0	0	0	0
0	0.0169	0.0095	0.0223	0.0194	0	0
0	0	0	0	0	0.9909	0.0040
0	0	0	0	0	0	0
0	0.0068	0	0	0	0.9649	0
0	0	0.0223	0	0	0	0
0	0	0	0	0	0	0.0075
0	0	0	0.0069	0	0	0
0.0711	0	0	0	0.0564	0	0
0	0	0	0	0.0061	0	0
0	0	0	0.0105	0	0	0
0.0092	0	0	0	0	0.9962	0
0	0.0209	0	0	0	0	0.0293
0	0	0.0136	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0079	0.9901	0	0	0	0
0	0	0.0075	0.9543	0.0459	0.9603
0	0	0	0	0	0
0	0	0.0213	0	0	0
0	0	0	0.9936	0	0
0.0063	0	0	0	0.0077	0
0	0.9288	0	0	0	0.9829
0	0	0	0.9602	0	0
0	0.9887	0	0	0	0
0	0	0	0	0.0074	0
0	0	0.0108	0	0	0
0.0384	0	0	0	0	0.9676

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

```

0.0000    0.0000    0.0000    0.0000    0.0000    1.0000    0.0000
Columns 15 through 20
0.0000    1.0000    0.0000    1.0000    0.0000    1.0000

output =
Columns 1 through 12
0      1      1      0      1      1      0      0      0      0      0      0

Columns 13 through 20
1      0      0      1      0      1      0      1

It took 3 number of iterations

p =
Columns 1 through 7
0.0374    0.5522    0.9768    0.0693    0.8607    0.9808    0.1440

Columns 8 through 14
0.0526    0.5118    0.4680    0.0791    0.5502    0.9110    0.2922

Columns 15 through 20
0.0483    0.9507    0.4553    0.9484    0.0500    0.8914

Iteration number 1
Variance 7.000000e-01
q0 =
Columns 1 through 7
0.0374      0      0      0      0      0.0374      0
0.5522      0      0      0      0      0      0.5522
0.9768      0      0      0      0      0      0
0.0693      0      0      0      0      0      0
0      0.8607      0      0      0      0.8607      0
0      0.9808      0      0      0      0      0.9808
0      0.1440      0      0      0      0      0
0      0.0526      0      0      0      0      0
0      0      0.5118      0      0      0.5118      0
0      0      0.4680      0      0      0      0.4680
0      0      0.0791      0      0      0      0
0      0      0.5502      0      0      0      0
0      0      0      0.9110      0      0.9110      0
0      0      0      0.2922      0      0      0
0      0      0      0.0483      0      0      0
0      0      0      0.9507      0      0      0
0      0      0      0      0.4553      0      0.4553
0      0      0      0      0.9484      0      0
0      0      0      0      0.0500      0      0
0      0      0      0      0.8914      0      0

```

Columns 8 through 14

0	0	0	0.0374	0	0	0
0	0	0	0	0.5522	0	0
0.9768	0	0	0	0	0.9768	0
0	0.0693	0	0	0	0	0.0693
0	0	0	0	0	0	0
0	0	0	0.9808	0	0	0
0.1440	0	0	0	0.1440	0	0
0	0	0.0526	0	0	0.0526	0
0	0	0	0	0	0	0.5118
0	0	0	0	0	0	0
0	0.0791	0	0	0.0791	0	0
0	0	0.5502	0.5502	0	0	0
0	0	0	0	0	0.9110	0
0.2922	0	0	0	0	0	0.2922
0	0.0483	0	0	0	0	0
0	0	0.9507	0	0.9507	0	0
0	0	0	0	0	0	0.4553
0.9484	0	0	0.9484	0	0	0
0	0.0500	0	0	0	0.0500	0
0	0	0.8914	0	0	0	0

Column 15

0
0
0
0
0.8607
0
0
0
0
0.4680
0
0
0
0
0.0483
0
0
0
0
0.8914

q1 =

Columns 1 through 7

0.9626	0	0	0	0	0.9626	0
0.4478	0	0	0	0	0	0.4478
0.0232	0	0	0	0	0	0
0.9307	0	0	0	0	0	0
0	0.1393	0	0	0	0.1393	0
0	0.0192	0	0	0	0	0.0192
0	0.8560	0	0	0	0	0
0	0.9474	0	0	0	0	0
0	0	0.4882	0	0	0.4882	0

0	0	0.5320	0	0	0	0.5320
0	0	0.9209	0	0	0	0
0	0	0.4498	0	0	0	0
0	0	0	0.0890	0	0.0890	0
0	0	0	0.7078	0	0	0
0	0	0	0.9517	0	0	0
0	0	0	0.0493	0	0	0
0	0	0	0	0.5447	0	0.5447
0	0	0	0	0.0516	0	0
0	0	0	0	0.9500	0	0
0	0	0	0	0.1086	0	0

Columns 8 through 14

0	0	0	0.9626	0	0	0
0	0	0	0	0.4478	0	0
0.0232	0	0	0	0	0.0232	0
0	0.9307	0	0	0	0	0.9307
0	0	0	0	0	0	0
0	0	0	0.0192	0	0	0
0.8560	0	0	0	0.8560	0	0
0	0	0.9474	0	0	0.9474	0
0	0	0	0	0	0	0.4882
0	0	0	0	0	0	0
0	0.9209	0	0	0.9209	0	0
0	0	0.4498	0.4498	0	0	0
0	0	0	0	0	0.0890	0
0.7078	0	0	0	0	0	0.7078
0	0.9517	0	0	0	0	0
0	0	0.0493	0	0.0493	0	0
0	0	0	0	0	0	0.5447
0.0516	0	0	0.0516	0	0	0
0	0.9500	0	0	0	0.9500	0
0	0	0.1086	0	0	0	0

Column 15

0
0
0
0
0.1393
0
0
0
0
0.5320
0
0
0
0
0.9517
0
0
0
0
0.1086

r1 =



Columns 1 through 7

0.5429	0.1200	0.4584	0.5460	0	0	0
0	0	0	0	0.1936	0.2701	0.8104
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4930	0	0	0	0.5090	0	0
0	0.4973	0	0	0	0.4997	0
0	0	0.3673	0	0	0	0.6777
0	0	0	0.8421	0	0	0
0	0	0	0	0	0	0
0.4567	0	0	0	0	0.5416	0
0	0.2298	0	0	0	0	0.5396
0	0	0.1691	0	0	0	0
0	0	0	0.4996	0	0	0
0	0	0	0	0.4774	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.7470	0	0	0	0	0	0
0	0.4973	0.5010	0.5001	0.4994	0	0
0	0	0	0	0	0.3308	0.8347
0	0	0	0	0	0	0
0	0.7743	0	0	0	0.5079	0
0	0	0.5045	0	0	0	0
0	0	0	0	0	0	0.8045
0	0	0	0.8501	0	0	0
0.4646	0	0	0	0.8157	0	0
0	0	0	0	0.8989	0	0
0	0	0	0.5335	0	0	0
0.8527	0	0	0	0	0.1160	0
0	0.5160	0	0	0	0	0.4991
0	0	0.7551	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.6540	0.3457	0	0	0	0
0	0	0.8159	0.4685	0.5314	0.4640
0	0	0	0	0	0
0	0	0.5032	0	0	0
0	0	0	0.3589	0	0
0.8262	0	0	0	0.8275	0
0	0.5352	0	0	0	0.5405
0	0	0	0.5447	0	0
0	0.4687	0	0	0	0
0	0	0	0	0.8507	0
0	0	0.4958	0	0	0
0.5180	0	0	0	0	0.4792

r0 =

Columns 1 through 7

0.4571	0.8800	0.5416	0.4540	0	0	0
0	0	0	0	0.8064	0.7299	0.1896
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5070	0	0	0	0.4910	0	0
0	0.5027	0	0	0	0.5003	0
0	0	0.6327	0	0	0	0.3223
0	0	0	0.1579	0	0	0
0	0	0	0	0	0	0
0.5433	0	0	0	0	0.4584	0
0	0.7702	0	0	0	0	0.4604
0	0	0.8309	0	0	0	0
0	0	0	0.5004	0	0	0
0	0	0	0	0.5226	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.2530	0	0	0	0	0	0
0	0.5027	0.4990	0.4999	0.5006	0	0
0	0	0	0	0	0.6692	0.1653
0	0	0	0	0	0	0
0	0.2257	0	0	0	0.4921	0
0	0	0.4955	0	0	0	0
0	0	0	0	0	0	0.1955
0	0	0	0.1499	0	0	0
0.5354	0	0	0	0.1843	0	0
0	0	0	0	0.1011	0	0
0	0	0	0.4665	0	0	0
0.1473	0	0	0	0	0.8840	0
0	0.4840	0	0	0	0	0.5009
0	0	0.2449	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.3460	0.6543	0	0	0	0
0	0	0.1841	0.5315	0.4686	0.5360
0	0	0	0	0	0
0	0	0.4968	0	0	0
0	0	0	0.6411	0	0
0.1738	0	0	0	0.1725	0
0	0.4648	0	0	0	0.4595
0	0	0	0.4553	0	0
0	0.5313	0	0	0	0
0	0	0	0	0.1493	0
0	0	0.5042	0	0	0
0.4820	0	0	0	0	0.5208

Q0 =

Columns 1 through 7

0.9615	0.0316	0.0024	0.9885	0.0355	0.0085	0.9843
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.9963	0.7754	0.7817	0.9869	0.9698	0.0065	0.9804
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.9948	0.0271	0.8407	0.0311	0.9983	0.1024
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0385	0.9684	0.9976	0.0115	0.9645	0.9915	0.0157
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0037	0.2246	0.2183	0.0131	0.0302	0.9935	0.0196
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0052	0.9729	0.1593	0.9689	0.0017	0.8976
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 2  
Variance 7.000000e-01  
q0 =

Columns 1 through 7

0.0454	0	0	0	0	0.0375	0
0.8069	0	0	0	0	0	0.9681
0.9972	0	0	0	0	0	0
0.0138	0	0	0	0	0	0
0	0.8672	0	0	0	0.9657	0
0	0.9774	0	0	0	0	0.9915
0	0.0639	0	0	0	0	0
0	0.0109	0	0	0	0	0
0	0	0.2227	0	0	0.4985	0
0	0	0.2189	0	0	0	0.2213
0	0	0.0131	0	0	0	0
0	0	0.0301	0	0	0	0
0	0	0	0.9869	0	0.9937	0
0	0	0	0.0915	0	0	0
0	0	0	0.0098	0	0	0
0	0	0	0.9500	0	0	0
0	0	0	0	0.4563	0	0.1610
0	0	0	0	0.9648	0	0
0	0	0	0	0.0019	0	0
0	0	0	0	0.8835	0	0

Columns 8 through 14

0	0	0	0.0326	0	0	0
0	0	0	0	0.9014	0	0
0.9959	0	0	0	0	0.9885	0
0	0.0584	0	0	0	0	0.0115
0	0	0	0	0	0	0
0	0	0	0.9928	0	0	0
0.0325	0	0	0	0.0184	0	0
0	0	0.0032	0	0	0.0212	0
0	0	0	0	0	0	0.2359
0	0	0	0	0	0	0
0	0.0699	0	0	0.0149	0	0
0	0	0.1212	0.2169	0	0	0
0	0	0	0	0	0.9525	0
0.0758	0	0	0	0	0	0.0195
0	0.0244	0	0	0	0	0
0	0	0.9764	0	0.9694	0	0
0	0	0	0	0	0	0.1570
0.9457	0	0	0.9738	0	0	0
0	0.0081	0	0	0	0.0096	0
0	0	0.9116	0	0	0	0

Column 15

0
0
0
0
0.9613
0
0
0
0
0
0.4626
0
0
0
0
0.0056
0
0
0
0
0.8897

q1 =

Columns 1 through 7

0.9546	0	0	0	0	0.9625	0
0.1931	0	0	0	0	0	0.0319
0.0028	0	0	0	0	0	0
0.9862	0	0	0	0	0	0
0	0.1328	0	0	0	0.0343	0
0	0.0226	0	0	0	0	0.0085
0	0.9361	0	0	0	0	0
0	0.9891	0	0	0	0	0
0	0	0.7773	0	0	0.5015	0

0	0	0.7811	0	0	0	0.7787
0	0	0.9869	0	0	0	0
0	0	0.9699	0	0	0	0
0	0	0	0.0131	0	0.0063	0
0	0	0	0.9085	0	0	0
0	0	0	0.9902	0	0	0
0	0	0	0.0500	0	0	0
0	0	0	0	0.5437	0	0.8390
0	0	0	0	0.0352	0	0
0	0	0	0	0.9981	0	0
0	0	0	0	0.1165	0	0

Columns 8 through 14

0	0	0	0.9674	0	0	0
0	0	0	0	0.0986	0	0
0.0041	0	0	0	0	0.0115	0
0	0.9416	0	0	0	0	0.9885
0	0	0	0	0	0	0
0	0	0	0.0072	0	0	0
0.9675	0	0	0	0.9816	0	0
0	0	0.9968	0	0	0.9788	0
0	0	0	0	0	0	0.7641
0	0	0	0	0	0	0
0	0.9301	0	0	0.9851	0	0
0	0	0.8788	0.7831	0	0	0
0	0	0	0	0	0.0475	0
0.9242	0	0	0	0	0	0.9805
0	0.9756	0	0	0	0	0
0	0	0.0236	0	0.0306	0	0
0	0	0	0	0	0	0.8430
0.0543	0	0	0.0262	0	0	0
0	0.9919	0	0	0	0.9904	0
0	0	0.0884	0	0	0	0

Column 15

0
0
0
0
0.0387
0
0
0
0
0.5374
0
0
0
0
0.9944
0
0
0
0
0.1103

r1 =

Columns 1 through 7

0.7967	0.0604	0.2287	0.7775	0	0	0
0	0	0	0	0.0927	0.1868	0.8429
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.5014	0	0	0	0.4986	0	0
0	0.3143	0	0	0	0.3231	0
0	0	0.1465	0	0	0	0.8750
0	0	0	0.9025	0	0	0
0	0	0	0	0	0	0
0.7644	0	0	0	0	0.2492	0
0	0.0613	0	0	0	0	0.8656
0	0	0.0750	0	0	0	0
0	0	0	0.6741	0	0	0
0	0	0	0	0.4712	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.8058	0	0	0	0	0	0
0	0.7572	0.7537	0.6465	0.6518	0	0
0	0	0	0	0	0.1396	0.9296
0	0	0	0	0	0	0
0	0.9254	0	0	0	0.4987	0
0	0	0.8119	0	0	0	0
0	0	0	0	0	0	0.9134
0	0	0	0.9133	0	0	0
0.7971	0	0	0	0.8896	0	0
0	0	0	0	0.9366	0	0
0	0	0	0.8630	0	0	0
0.9336	0	0	0	0	0.0412	0
0	0.8220	0	0	0	0	0.6770
0	0	0.8555	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.8580	0.1100	0	0	0	0
0	0	0.8552	0.4666	0.5311	0.4596
0	0	0	0	0	0
0	0	0.7564	0	0	0
0	0	0	0.1066	0	0
0.8737	0	0	0	0.8614	0
0	0.1902	0	0	0	0.1414
0	0	0	0.2392	0	0
0	0.1249	0	0	0	0
0	0	0	0	0.9233	0
0	0	0.7479	0	0	0
0.5269	0	0	0	0	0.4659

r0 =

Columns 1 through 7

0.2033	0.9396	0.7713	0.2225	0	0	0
0	0	0	0	0.9073	0.8132	0.1571
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.4986	0	0	0	0.5014	0	0
0	0.6857	0	0	0	0.6769	0
0	0	0.8535	0	0	0	0.1250
0	0	0	0.0975	0	0	0
0	0	0	0	0	0	0
0.2356	0	0	0	0	0.7508	0
0	0.9387	0	0	0	0	0.1344
0	0	0.9250	0	0	0	0
0	0	0	0.3259	0	0	0
0	0	0	0	0.5288	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.1942	0	0	0	0	0	0
0	0.2428	0.2463	0.3535	0.3482	0	0
0	0	0	0	0	0.8604	0.0704
0	0	0	0	0	0	0
0	0.0746	0	0	0	0.5013	0
0	0	0.1881	0	0	0	0
0	0	0	0	0	0	0.0866
0	0	0	0.0867	0	0	0
0.2029	0	0	0	0.1104	0	0
0	0	0	0	0.0634	0	0
0	0	0	0.1370	0	0	0
0.0664	0	0	0	0	0.9588	0
0	0.1780	0	0	0	0	0.3230
0	0	0.1445	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.1420	0.8900	0	0	0	0
0	0	0.1448	0.5334	0.4689	0.5404
0	0	0	0	0	0
0	0	0.2436	0	0	0
0	0	0	0.8934	0	0
0.1263	0	0	0	0.1386	0
0	0.8098	0	0	0	0.8586
0	0	0	0.7608	0	0
0	0.8751	0	0	0	0
0	0	0	0	0.0767	0
0	0	0.2521	0	0	0
0.4731	0	0	0	0	0.5341

Q0 =

Columns 1 through 7

0.9970	0.0016	0.0001	0.9989	0.0144	0.0007	0.9993
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.9998	0.9942	0.9889	0.9993	0.9945	0.0007	0.9986
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.9989	0.0002	0.9849	0.0018	0.9994	0.0147
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0030	0.9984	0.9999	0.0011	0.9856	0.9993	0.0007
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0002	0.0058	0.0111	0.0007	0.0055	0.9993	0.0014
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0011	0.9998	0.0151	0.9982	0.0006	0.9853
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

Iteration number 3  
Variance 7.000000e-01  
q0 =

Columns 1 through 7

0.0118	0	0	0	0	0.0030	0
0.9763	0	0	0	0	0	0.9966
0.9997	0	0	0	0	0	0
0.0039	0	0	0	0	0	0
0	0.8746	0	0	0	0.9855	0
0	0.9969	0	0	0	0	0.9985
0	0.0037	0	0	0	0	0
0	0.0010	0	0	0	0	0
0	0	0.0180	0	0	0.0678	0
0	0	0.0333	0	0	0	0.0463
0	0	0.0013	0	0	0	0
0	0	0.0102	0	0	0	0
0	0	0	0.9958	0	0.9993	0
0	0	0	0.0183	0	0	0
0	0	0	0.0065	0	0	0
0	0	0	0.9983	0	0	0
0	0	0	0	0.0832	0	0.0455
0	0	0	0	0.9980	0	0
0	0	0	0	0.0007	0	0
0	0	0	0	0.9828	0	0



Columns 8 through 14

0	0	0	0.0098	0	0	0
0	0	0	0	0.9767	0	0
0.9994	0	0	0	0	0.9988	0
0	0.0102	0	0	0	0	0.0023
0	0	0	0	0	0	0
0	0	0	0.9979	0	0	0
0.0048	0	0	0	0.0045	0	0
0	0	0.0010	0	0	0.0034	0
0	0	0	0	0	0	0.0264
0	0	0	0	0	0	0
0	0.0074	0	0	0.0044	0	0
0	0	0.0423	0.0750	0	0	0
0	0	0	0	0	0.9845	0
0.0147	0	0	0	0	0	0.0030
0	0.0075	0	0	0	0	0
0	0	0.9991	0	0.9985	0	0
0	0	0	0	0	0	0.0436
0.9852	0	0	0.9943	0	0	0
0	0.0038	0	0	0	0.0074	0
0	0	0.9171	0	0	0	0

Column 15

0
0
0
0
0.9838
0
0
0
0
0
0.0624
0
0
0
0
0.0012
0
0
0
0
0.9832

q1 =

Columns 1 through 7

0.9882	0	0	0	0	0.9970	0
0.0237	0	0	0	0	0	0.0034
0.0003	0	0	0	0	0	0
0.9961	0	0	0	0	0	0
0	0.1254	0	0	0	0.0145	0
0	0.0031	0	0	0	0	0.0015
0	0.9963	0	0	0	0	0
0	0.9990	0	0	0	0	0
0	0	0.9820	0	0	0.9322	0

0	0	0.9667	0	0	0	0.9537
0	0	0.9987	0	0	0	0
0	0	0.9898	0	0	0	0
0	0	0	0.0042	0	0.0007	0
0	0	0	0.9817	0	0	0
0	0	0	0.9935	0	0	0
0	0	0	0.0017	0	0	0
0	0	0	0	0.9168	0	0.9545
0	0	0	0	0.0020	0	0
0	0	0	0	0.9993	0	0
0	0	0	0	0.0172	0	0

Columns 8 through 14

0	0	0	0.9902	0	0	0
0	0	0	0	0.0233	0	0
0.0006	0	0	0	0	0.0012	0
0	0.9898	0	0	0	0	0.9977
0	0	0	0	0	0	0
0	0	0	0.0021	0	0	0
0.9952	0	0	0	0.9955	0	0
0	0	0.9990	0	0	0.9966	0
0	0	0	0	0	0	0.9736
0	0	0	0	0	0	0
0	0.9926	0	0	0.9956	0	0
0	0	0.9577	0.9250	0	0	0
0	0	0	0	0	0.0155	0
0.9853	0	0	0	0	0	0.9970
0	0.9925	0	0	0	0	0
0	0	0.0009	0	0.0015	0	0
0	0	0	0	0	0	0.9564
0.0148	0	0	0.0057	0	0	0
0	0.9962	0	0	0	0.9926	0
0	0	0.0829	0	0	0	0

Column 15

0
0
0
0
0.0162
0
0
0
0
0.9376
0
0
0
0
0.9988
0
0
0
0
0.0168

r1 =

Columns 1 through 7

0.9723	0.0159	0.0385	0.9648	0	0	0
0	0	0	0	0.0078	0.1289	0.8715
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.9191	0	0	0	0.0710	0	0
0	0.0889	0	0	0	0.0904	0
0	0	0.0336	0	0	0	0.9704
0	0	0	0.9815	0	0	0
0	0	0	0	0	0	0
0.9184	0	0	0	0	0.0880	0
0	0.0103	0	0	0	0	0.9710
0	0	0.0260	0	0	0	0
0	0	0	0.9298	0	0	0
0	0	0	0	0.0781	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.8695	0	0	0	0	0	0
0	0.9560	0.9710	0.9408	0.9488	0	0
0	0	0	0	0	0.0263	0.9877
0	0	0	0	0	0	0
0	0.9819	0	0	0	0.0829	0
0	0	0.9500	0	0	0	0
0	0	0	0	0	0	0.9800
0	0	0	0.9788	0	0	0
0.8811	0	0	0	0.9156	0	0
0	0	0	0	0.9826	0	0
0	0	0	0.9710	0	0	0
0.9761	0	0	0	0	0.0120	0
0	0.9516	0	0	0	0	0.9303
0	0	0.9665	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.9760	0.0286	0	0	0	0
0	0	0.9802	0.0981	0.9008	0.0855
0	0	0	0	0	0
0	0	0.9493	0	0	0
0	0	0	0.0199	0	0
0.9788	0	0	0	0.9753	0
0	0.1189	0	0	0	0.0441
0	0	0	0.0851	0	0
0	0.0318	0	0	0	0
0	0	0	0	0.9800	0
0	0	0.9687	0	0	0
0.9092	0	0	0	0	0.0776

r0 =

Columns 1 through 7

0.0277	0.9841	0.9615	0.0352	0	0	0
0	0	0	0	0.9922	0.8711	0.1285
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0.0809	0	0	0	0.9290	0	0
0	0.9111	0	0	0	0.9096	0
0	0	0.9664	0	0	0	0.0296
0	0	0	0.0185	0	0	0
0	0	0	0	0	0	0
0.0816	0	0	0	0	0.9120	0
0	0.9897	0	0	0	0	0.0290
0	0	0.9740	0	0	0	0
0	0	0	0.0702	0	0	0
0	0	0	0	0.9219	0	0

Columns 8 through 14

0	0	0	0	0	0	0
0.1305	0	0	0	0	0	0
0	0.0440	0.0290	0.0592	0.0512	0	0
0	0	0	0	0	0.9737	0.0123
0	0	0	0	0	0	0
0	0.0181	0	0	0	0.9171	0
0	0	0.0500	0	0	0	0
0	0	0	0	0	0	0.0200
0	0	0	0.0212	0	0	0
0.1189	0	0	0	0.0844	0	0
0	0	0	0	0.0174	0	0
0	0	0	0.0290	0	0	0
0.0239	0	0	0	0	0.9880	0
0	0.0484	0	0	0	0	0.0697
0	0	0.0335	0	0	0	0

Columns 15 through 20

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0.0240	0.9714	0	0	0	0
0	0	0.0198	0.9019	0.0992	0.9145
0	0	0	0	0	0
0	0	0.0507	0	0	0
0	0	0	0.9801	0	0
0.0212	0	0	0	0.0247	0
0	0.8811	0	0	0	0.9559
0	0	0	0.9149	0	0
0	0.9682	0	0	0	0
0	0	0	0	0.0200	0
0	0	0.0313	0	0	0
0.0908	0	0	0	0	0.9224

Q0 =

Columns 1 through 7

1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

1.0000	1.0000	1.0000	1.0000	0.9999	0.0000	1.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

1.0000	0.0000	1.0000	0.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------

Q1 =

Columns 1 through 7

0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 8 through 14

0.0000	0.0000	0.0000	0.0000	0.0001	1.0000	0.0000
--------	--------	--------	--------	--------	--------	--------

Columns 15 through 20

0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
--------	--------	--------	--------	--------	--------

output =

Columns 1 through 12

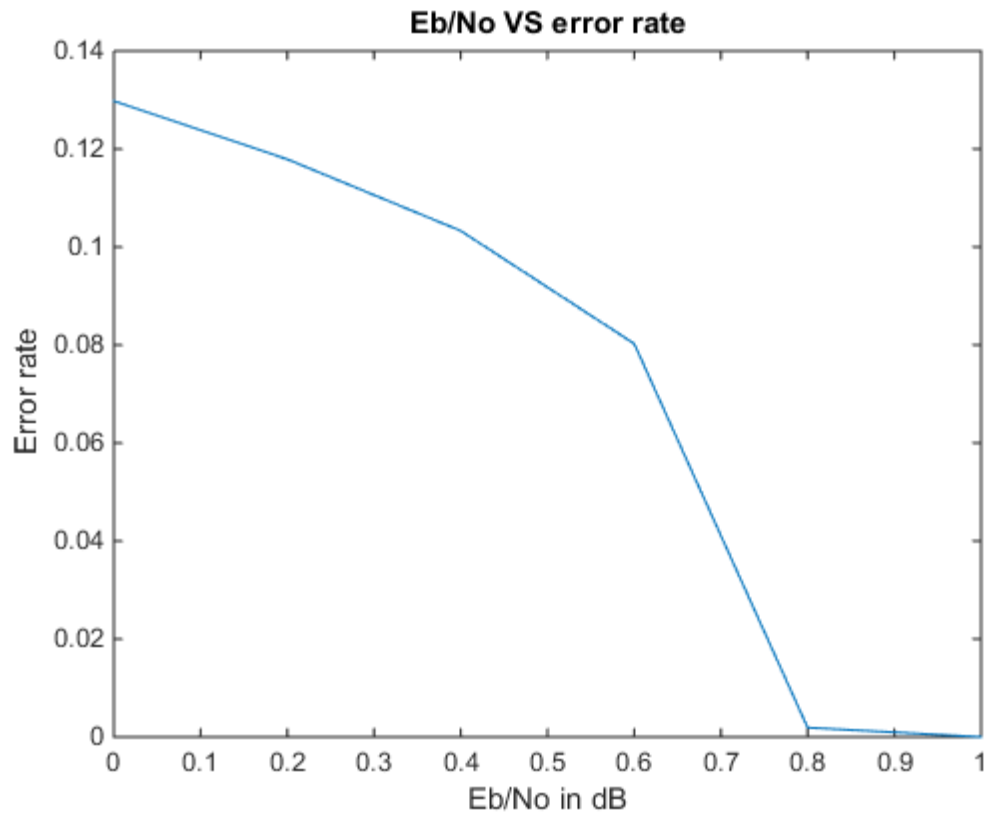
0	1	1	0	1	1	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Columns 13 through 20

1	0	0	1	0	1	0	1
---	---	---	---	---	---	---	---

It took 3 number of iterations  
diary off

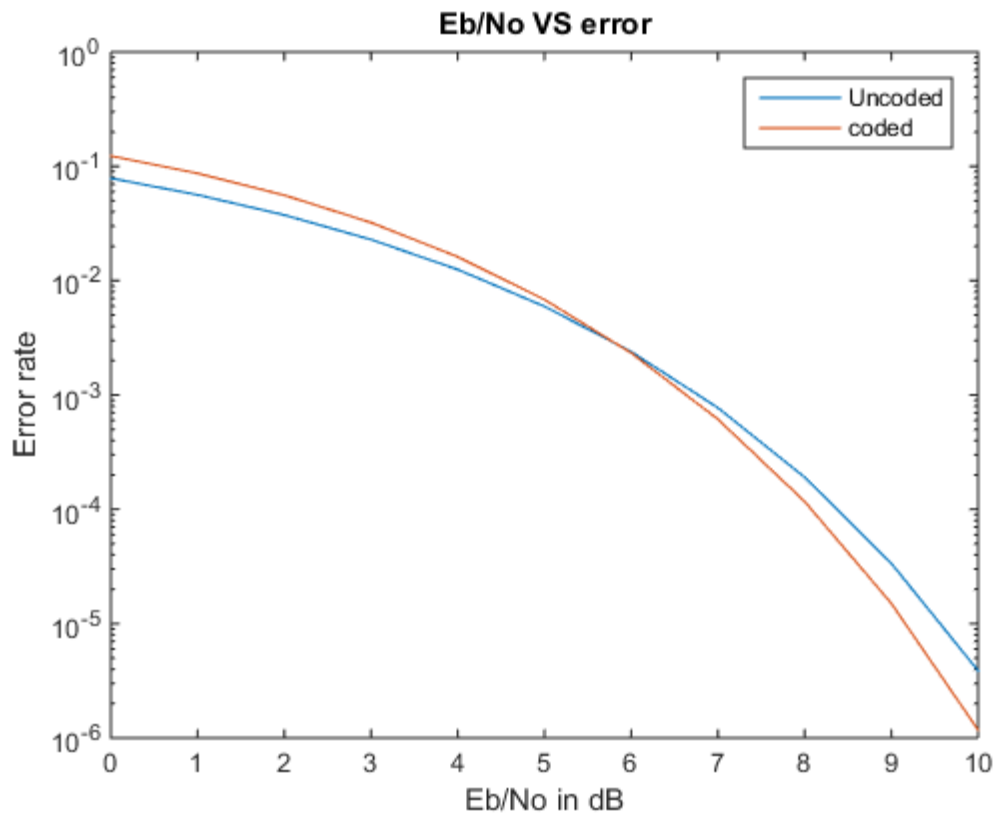
```
EbN0=[0 0.2 0.4 0.6 0.8 1];  
errorrate=[0.1298 0.1179 0.1033 0.08026 0.001907 0];  
plot(EbN0,errorrate);  
title('Eb/No VS error rate');  
xlabel('Eb/No in dB');  
ylabel('Error rate');
```



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```
EbNo=(0:10)';  
beruncoded=berawgn(EbNo,'psk',4,'nondiff');  
bercoded=bercoding(EbNo,'block','hard',7,4,3);  
semilogy(EbNo,[beruncoded,bercoded]);  
title('Eb/No VS error');  
xlabel('Eb/No in dB');  
ylabel('Error rate');  
legend('Uncoded','coded');
```



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```

clc;
EbNo1=0:1:10;
EbNo=EbNo1/10;
%find the Pe values from the eqn
for i=1:11
    EbNomag(1,i)=10^EbNo(1,i);
    x=sqrt(2*EbNomag(1,i));
    %x=sqrt(2*EbNo1(i));
    q=qfunc(x);
    z(1,i)=2*q*(1-(q/2));
end
display(z);
plot(EbNo1,(z));
hold on
%qpsk coded from simulink
Error=[0.13 0 0 0 0 0 0 0 0 0];
plot(EbNo1,Error);
hold off
legend('uncoded','coded');
title('Eb/No VS error rate');
xlabel('Eb/No in dB');
ylabel('Error rate');

```

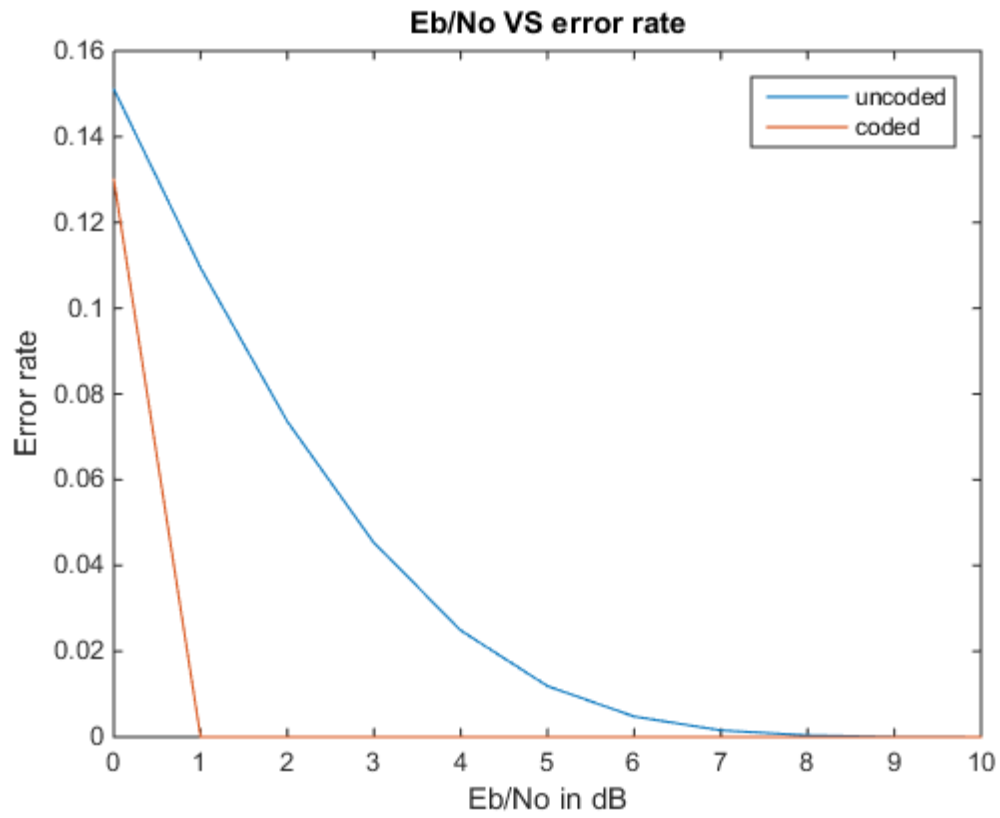
z =

Columns 1 through 7

0.1511	0.1094	0.0736	0.0452	0.0248	0.0119	0.0048
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Columns 8 through 11

0.0015	0.0004	0.0001	0.0000
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