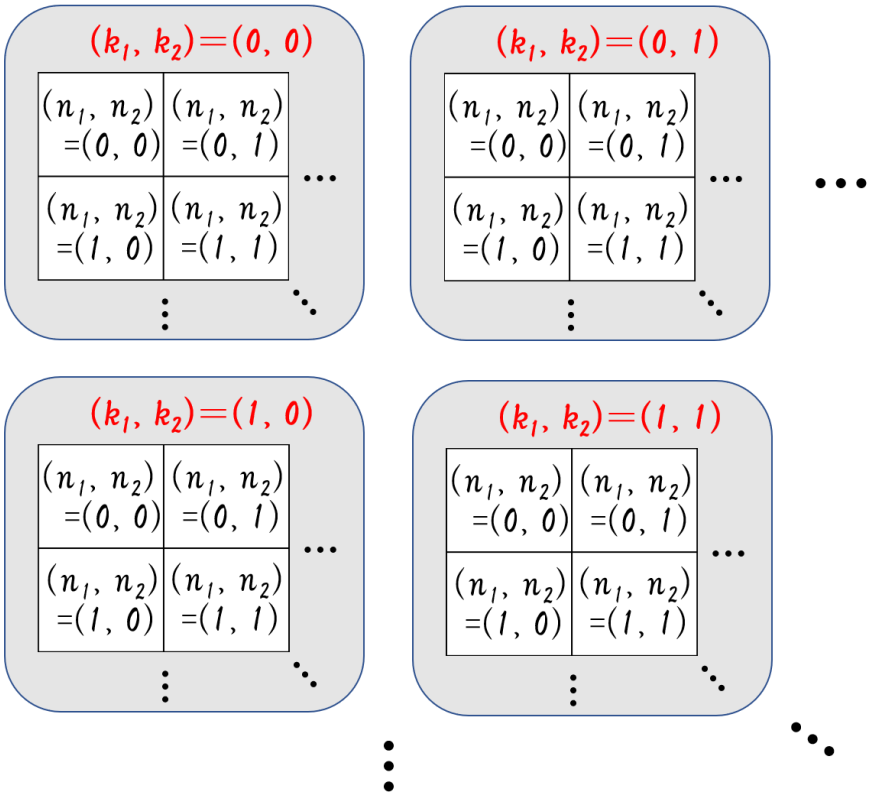
【離散コサイン変換基底画像　　Discrete Cosine Transform Base Image】

$$b_{k_1k_2}(n_1,n_2)=\frac{2}{N}a_{k_1}a_{k_2}\cos\left(\frac{(2n_1+1)k_1\pi}{2N}\right)\cos\left(\frac{(2n_2+1)k_2\pi}{2N}\right)$$

$$a_{k_1}=\begin{cases}1 & (k_1=1,2,\cdots,N-1)\\ \dfrac{1}{\sqrt{2}} & (k_1=0)\end{cases}$$

$$a_{k_2}=\begin{cases}1 & (k_2=1,2,\cdots,N-1)\\ \dfrac{1}{\sqrt{2}} & (k_2=0)\end{cases}$$



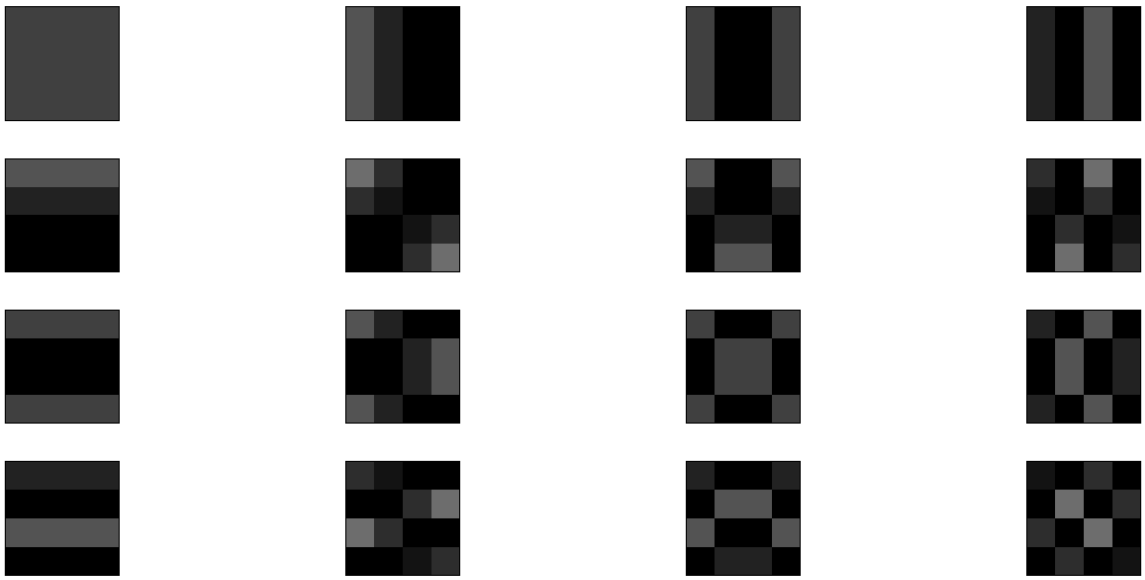


Figure 1: Scilab 実行結果
$N = 4$ の場合

Source Code 1: Scilab

```
////////////////////////////////////////
//      離散コサイン変換基底画像
//  Discrete Cosine Transform Base Image
//
//                              M.Tsutsui
////////////////////////////////////////

clear;

N=4;

i=1;
for k1=0:1:N-1;
        for k2=0:1:N-1;
                for n1=0:1:N-1;
                        for n2=0:1:N-1;
                                if(k1==0);
                                        ak1=1/sqrt(2);
                                else
                                        ak1=1;
                                end
                                if(k2==0);
                                        ak2=1/sqrt(2);
                                else
                                        ak2=1;
                                end
                                b(n1+1,n2+1)=2/N*ak1*ak2*cos(((2*n1+1)*k1*%pi)/(2*N))*cos(((2*n2+1)*k2*%pi)/(2*N));
                        end
                end
                subplot(N,N,i);
                imshow(b);
                mtlb_axis('equal');
                i=i+1;
        end
end
```