Application Problems:

Problem 5.5: Optimal Control of a unit mass, new norms

```matlab
%%% A)
A = [1 1; 0 1];
b = [1/2; 1];
t = 10;
C = []
```

```
C =

     []
```

```matlab
for i = t-1:-1:1
    C = [C, A^i * b];
end

p = transpose(C)*inv((C*transpose(C)))
```

```
p = 9×2
    0.0667   -0.2556
    0.0500   -0.1639
    0.0333   -0.0722
    0.0167    0.0194
   -0.0000    0.1111
   -0.0167    0.2028
   -0.0333    0.2944
   -0.0500    0.3861
   -0.0667    0.4778
```

```matlab
%%% B)
%%% C)
```

Problem 5.6: Portfolio Design

```matlab
%%% A)
%%% B)
%%% C)
```

Problem 5.7: Sparse Coding of Images

```matlab
%%% A)
%%% B)
%%% C)
%%% D)
```