Contents

Given Code

```
clear;
A = [
5 2 1 0
1 1 2 3
0 1 2 4
0 3 3 1
3 2 1 1
2 0 3 1
1 3 0 2];

y = [20; 5; 3; 4; 10; 5; 5];
```

Part A

```
%Using Lagrangian multipliers and Least Squares a
a = A(1,:)';
Ahat = [2*A'*A a; a' 0];
yhat = [2*A'*y; 20];

xlambda = Ahat\yhat;
%x is the vector of money that minimizes the cost function
x = xlambda(1:4,1)
%Calculates the squared deviation when using the estimated x
res = norm(A*x - y)^2;
['The residual value using this A is ' num2str(res)]
%The power generated
A*x
```

```
x =

    3.6084
    0.9771
    0.0039
    0.0702


ans =

The residual value using this A is 20.2687


ans =

   20.0000
```

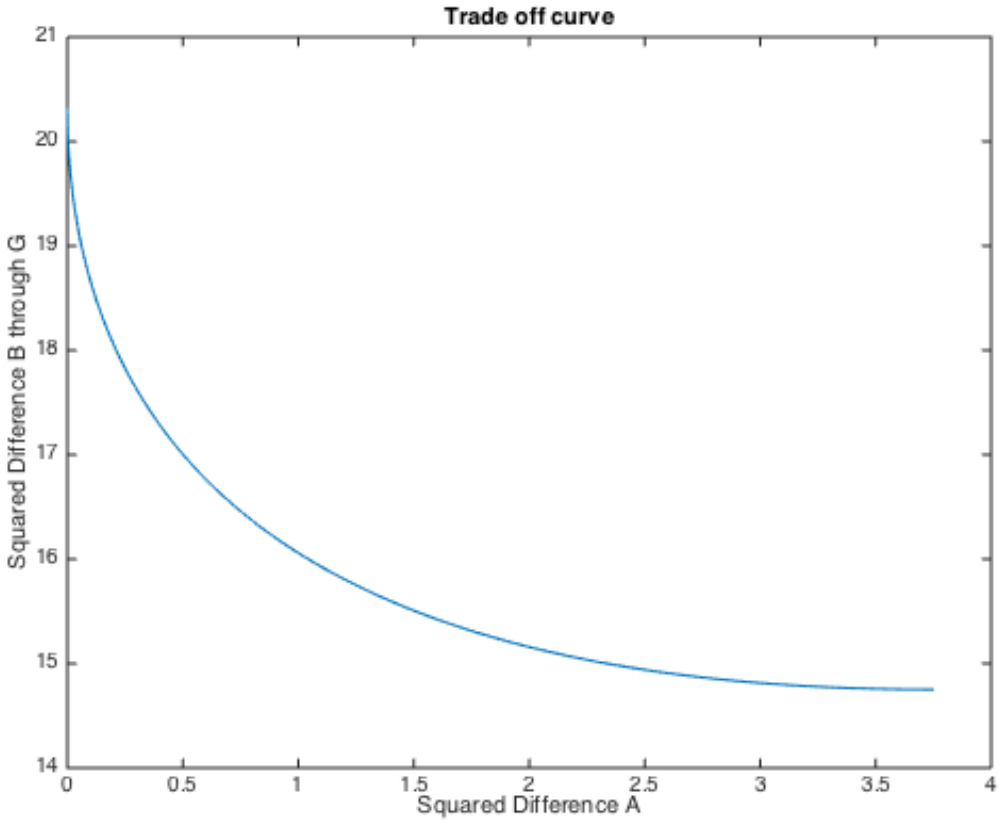
```
    4.8039
    1.2657
    3.0133
   12.8535
    7.2986
    6.6801
```

Part B

```
i = 1;
B = A(:,1:3);

%Varying mu to trace the trade off curve
i=1;
for mu = 0:0.01:1000
    mu;
    Bhat = [B; sqrt(mu)*B(1,:)];
    yhat = [y;sqrt(mu)*20];
    m  = (Bhat'*Bhat)\Bhat'*yhat;

    stdBGtemp(i) = norm( B*m - y)^2;
    stdAtemp(i) = norm(B(1,:)*m - 20)^2;
    i = i+1;
end
figure;
plot(stdAtemp, stdBGtemp);
xlabel('Squared Difference A');
ylabel('Squared Difference B through G');
title('Trade off curve');
```



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