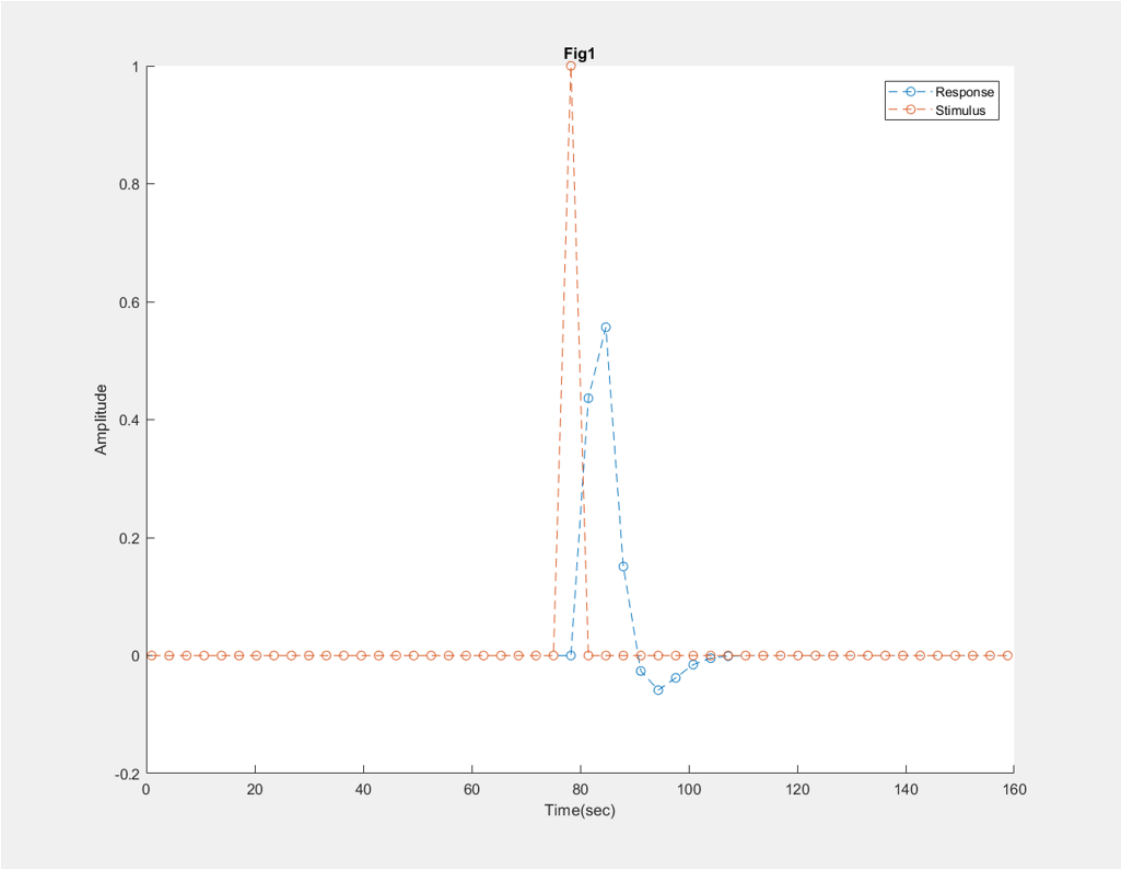
Code Appendix:

Table of Contents

6.6A,B

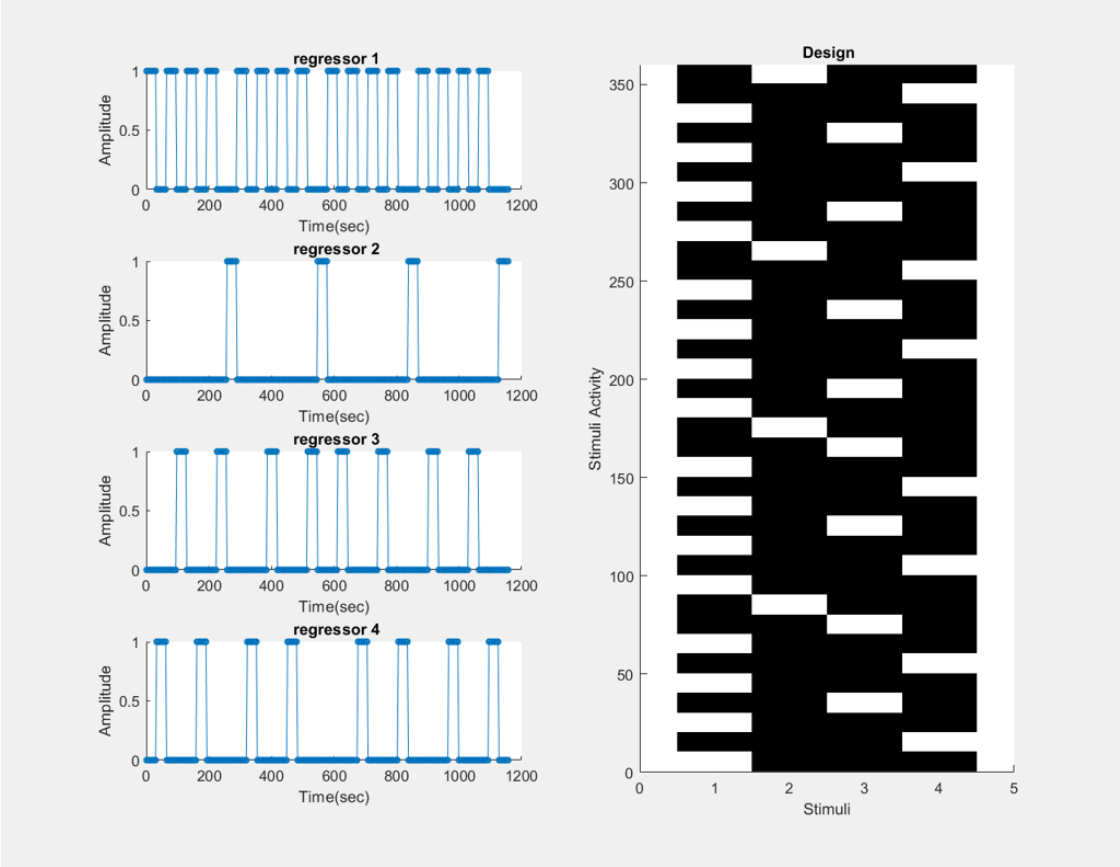
```
%Loading file:
load('opdracht_fMRI_klein.mat');

%Initiating vectors.
v1 = zeros(1,50);
v1(25) = 1;

%Convolve v1 with hrf.
r1 = conv(v1,hrf);
r1 = r1(1:50);

%Initiating time series.
time = 1:3.22:50*3.22;

%Plotting
figure('Position', [250, 250, 1024, 1200]);
hold on;
title("Fig1");
plot(time,r1,'o--');
plot(time,v1,'o--');
legend("Response","Stimulus");
xlabel("Time(sec)");
ylabel("Amplitude");
hold off;
```

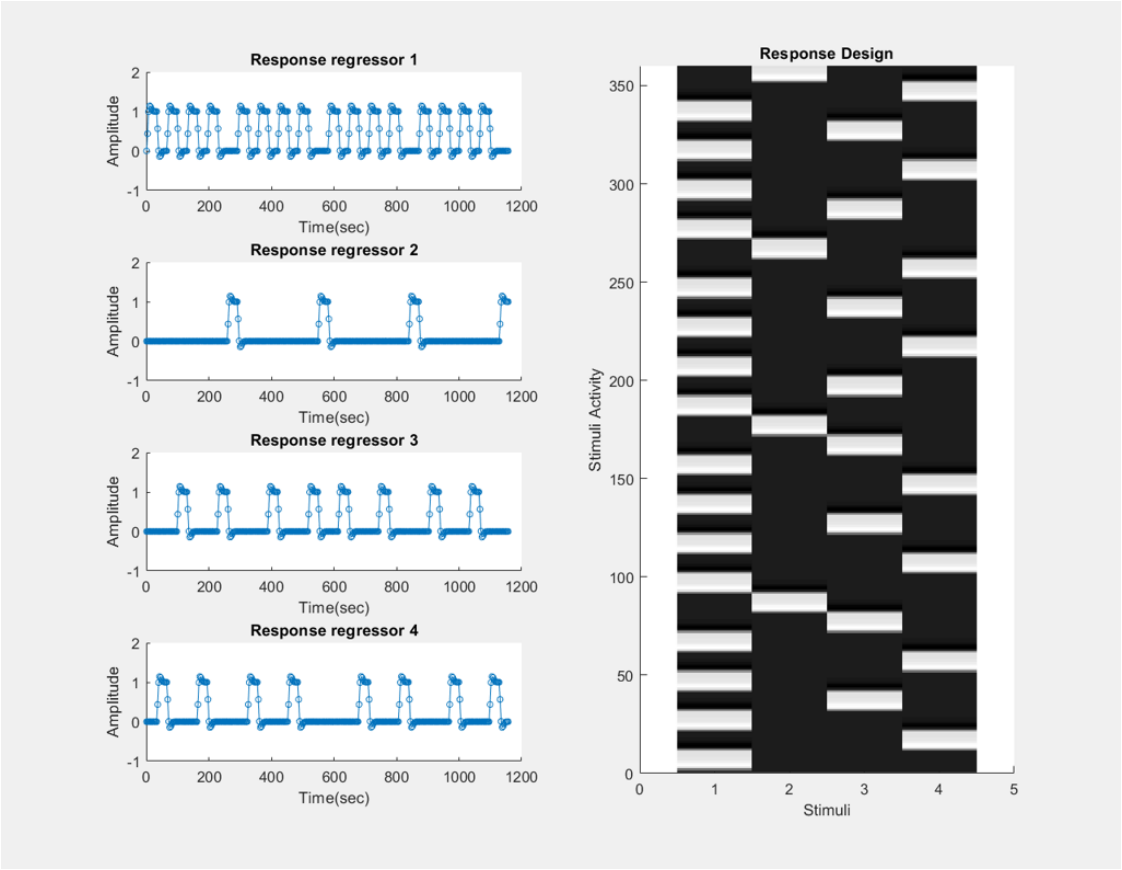


6.6C

```
%A
%Loading file
load('opdracht_fMRI_klein.mat');

%Initiating vector and time series.
D = zeros(5,360);
time = 1:3.22:360*3.22;

%F
%Inserting data into non convolved design matrix.
D(1,:) = 1;
D(2,fix) = 1;
D(3,stat) = 1;
D(4,natt) = 1;
D(5,att) = 1;
D = D';

%B
%Plotting design with function.
figure('Position', [250, 250, 1024, 1200]);
design(D,time,"");

%D
```

```
%Convolving design matrix.
resp = conv2(D,hrf);
resp = resp(1:360,:);

%E
%Plotting convolved design matrix with function.
figure('Position', [250, 250, 1024, 1200]);
design(resp,time,"Response");
```





6.6D

```
%A
%Plotting bolt and responses superexposed.
figure('Position', [250, 250, 1024, 1200]);
for i=1:3
    subplot(3,1,i)
    hold on
    title("Fig4." + i);
    plot(time,bold(:,i));
    for(j=1:4)
        plot(time,resp(:,j+1),'o--');
    end
    legend("Bolt","Fix resp","Stat resp","Natt resp","Att resp");
    xlabel("Time(sec)");
    ylabel("Amplitude");
    hold off
end

%B
%Initating vector and filling with regression coefs.
beta = zeros(5,3);
for i=1:3
    beta(:,i) = regress(bold(:,i),resp);
end
```

```
%C
%fitting data by multiplying by convolved design matrix.
fitted = resp*beta;
%Calculating error
error = abs(bold - fitted);
%Plotting fitted data, measured data and error superexposed.
figure('Position', [250, 250, 1024, 1200]);
for i=1:3
    subplot(3,1,i)
    hold on;
    plot(time,bold(:,i),'go--');
    plot(time,fitted(:,i),'bo--');
    plot(time,error(:,i),'ro--');
    xlabel("Time(sec)")
    ylabel("Amplitude")
    title("Fig5." + i);
    legend("Bolt","Bolt*","Error");
    hold off;
end

%D
%Computing sum of squared errors.
sse = sum(error.^2);
```

```
Warning: X is rank deficient to within machine precision.
Warning: X is rank deficient to within machine precision.
Warning: X is rank deficient to within machine precision.
```

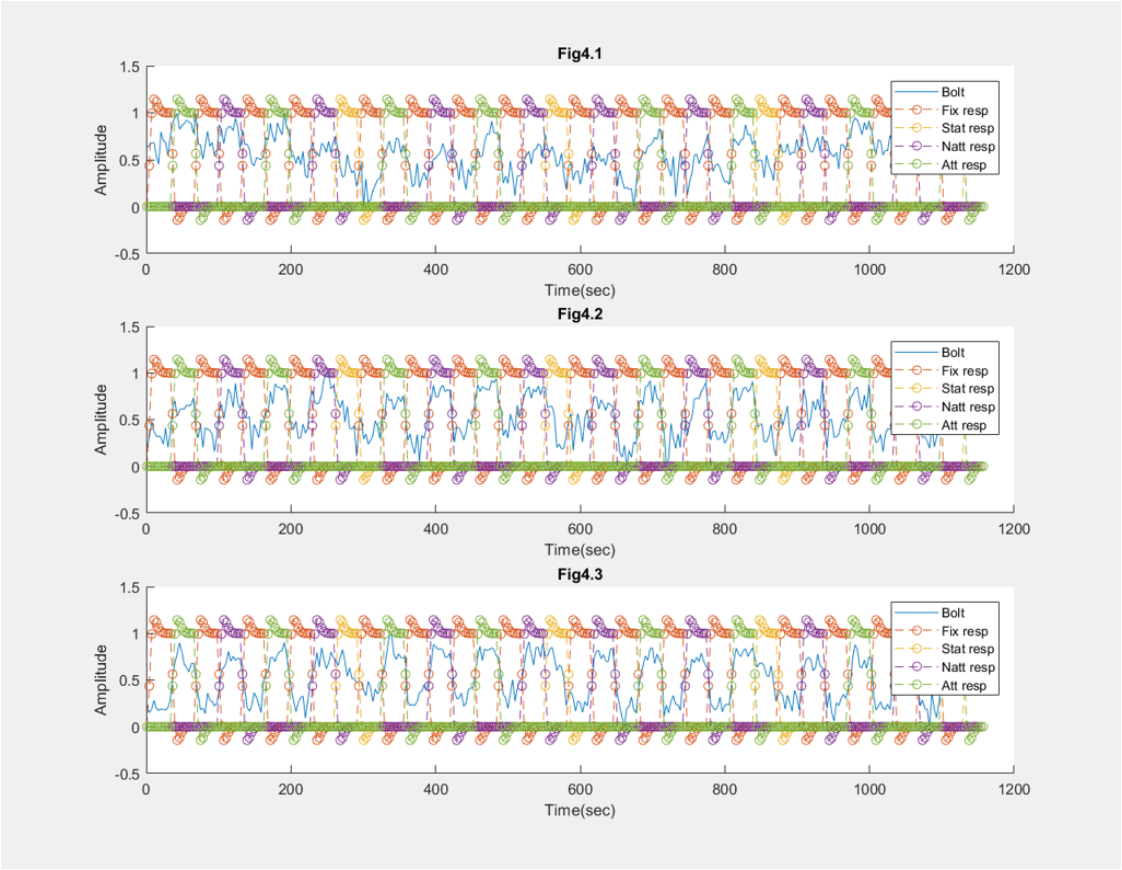
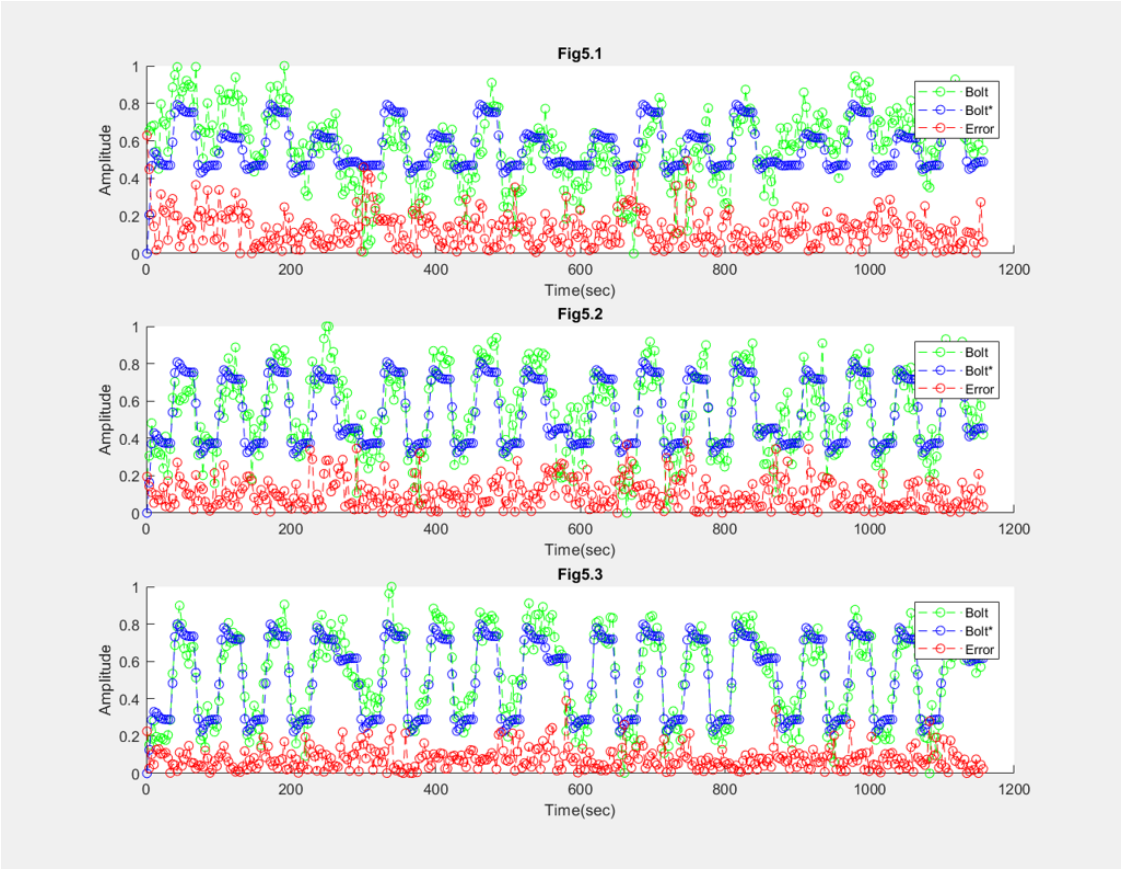


Fig4.1
Amplitude
Time(sec)
Bolt
Fix resp
Stat resp
Natt resp
Att resp
Fig4.2
Amplitude
Time(sec)
Bolt
Fix resp
Stat resp
Natt resp
Att resp
Fig4.3
Amplitude
Time(sec)
Bolt
Fix resp
Stat resp
Natt resp
Att resp

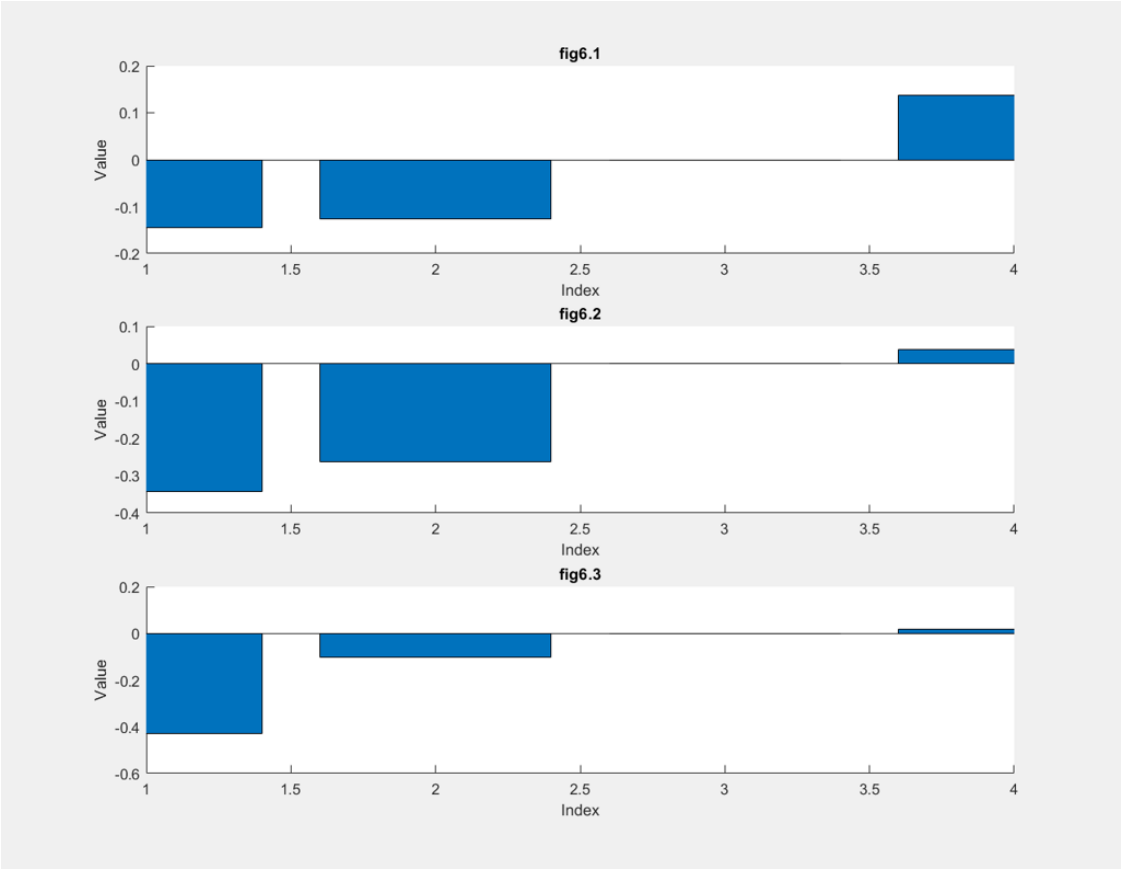


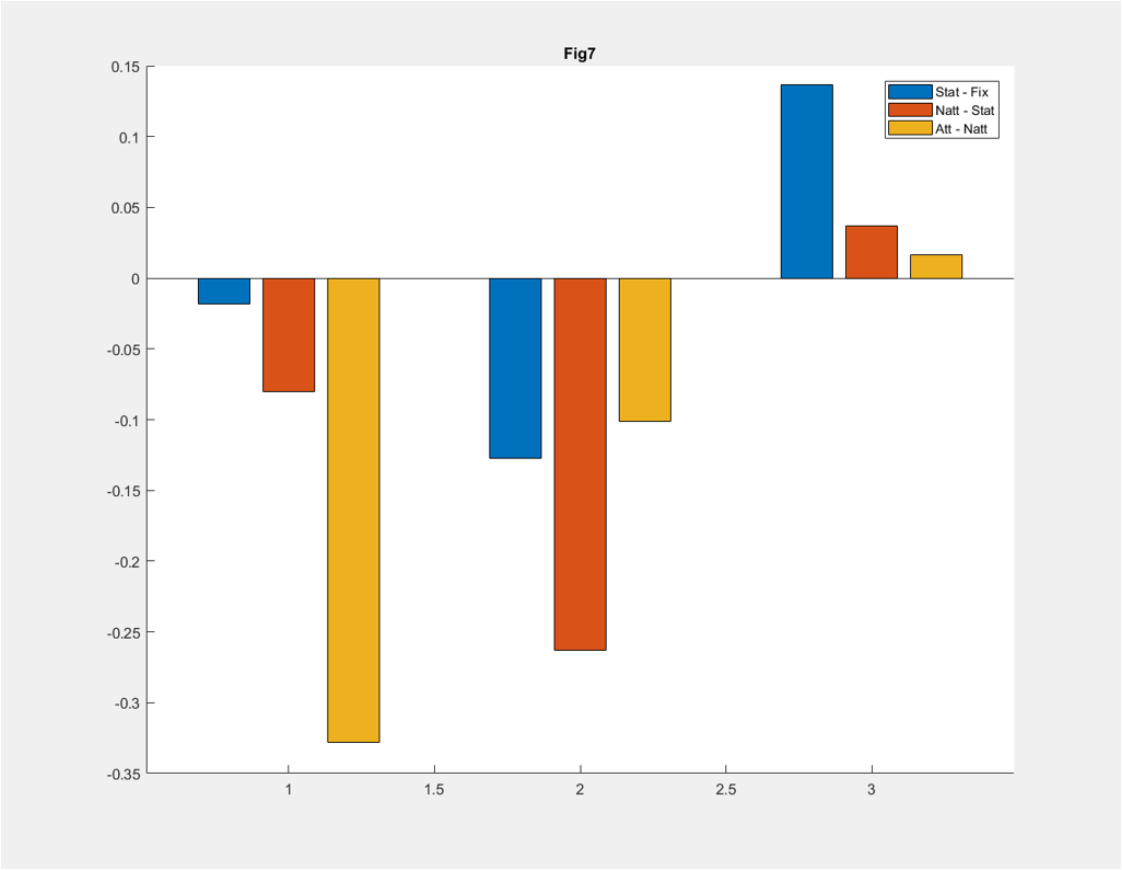
6.6E

```
%A
%Plotting histogram of regression coefs.
figure('Position', [250, 250, 1024, 1200]);
for i=1:3
    subplot(3,1,i);
    hold on;
    title("fig6." + i);
    bar(beta(2:end,i));
    xlabel("Index")
    ylabel("Value")
    xlim([1,4]);
end
%B
%Calculating differenses
betastar = zeros(3,3)
betastar(1,:) = beta(2,:) - beta(3,:);
betastar(2,:) = beta(3,:) - beta(4,:);
betastar(3,:) = beta(5,:) - beta(4,:);

%Plotting
figure('Position', [250, 250, 1024, 1200]);
hold on;
title("Fig7");
```

```
bar(betastar);
legend("Stat - Fix", "Natt - Stat", "Att - Natt");
hold off
```

```
betastar =

     0     0     0
     0     0     0
     0     0     0
```





7.4

```
load('detection.mat');
%Initiating data matrices.
d1 = zeros(4,6);
d2 = zeros(4,6);
%Filling data matrices with the false pos, false neg rates, d-prime
 and
%criterion values
for i=1:6
    d1(1,i) = sum(Resp1(:,1) == Stim1(:,i))/1000;
    d2(1,i) = sum(Resp2(:,1) == Stim2(:,i))/1000;
    d1(2,i) = sum(Resp1(:,1) == 1 & Stim1(:,i) ==0)/1000;
    d2(2,i) = sum(Resp2(:,1) == 1 & Stim2(:,i) ==0)/1000;
    [d1(3,i),d1(4,i)] = dcrit(d1(1,i),d1(2,i));
    [d2(3,i),d2(4,i)] = dcrit(d2(1,i),d2(2,i));
end
```

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