
Baby Project - ECE Math 2

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Tyer Sriver April , 2015

clean up

```
clear all;  
close all;  
clc;
```

Load Data

```
load('baby(1).mat');
```

Variables

```
MAGE = baby(:, 1);  
BWEIGHT = baby(:, 2);  
APGAR5 = baby(:, 3);  
GEST = baby(:, 7);  
CIG_3 = baby(:, 11);
```

Correlation Comparisons

```
% Mothers Age and Birth Weight  
AgeWeight = corrcoef(MAGE, BWEIGHT);  
fprintf('The correlation for Mothers age and Baby weight is:');  
disp(AgeWeight(1,2));  
  
% Birth Weight and APGAR5  
WeightAPGAR = corrcoef(BWEIGHT, APGAR5);  
fprintf('The correlation for Birth Weight and APGAR 5m score is:');  
disp(WeightAPGAR(1,2));  
  
% Birth Weight and Gestation  
WeightGest = corrcoef(BWEIGHT, GEST);  
fprintf('The correlation for Birth Weight and Gestation is:');  
disp(WeightGest(1,2));
```

```
% Mother Smoking 3rd Trimester and Birth weight
SmokeWeight = corrcoef(CIG_3, BWEIGHT);
fprintf('The correlation for Mother smoking 3rd Tri and Birth weight:');
disp(SmokeWeight(1,2));

    The correlation for Mothers age and Baby weight is:    0.0594

    The correlation for Birth Weight and APGAR 5m score is:    0.2433

    The correlation for Birth Weight and Gestation is:    0.6673

    The correlation for Mother smoking 3rd Tri and Birth weight:    -0.0161
```

Probability Distribution of Birth Weight

```
WeightStep = 0:110:8200;
[H, x] = hist(BWEIGHT, WeightStep);
TotBirths = size(BWEIGHT);
H = H / TotBirths(1)/110;

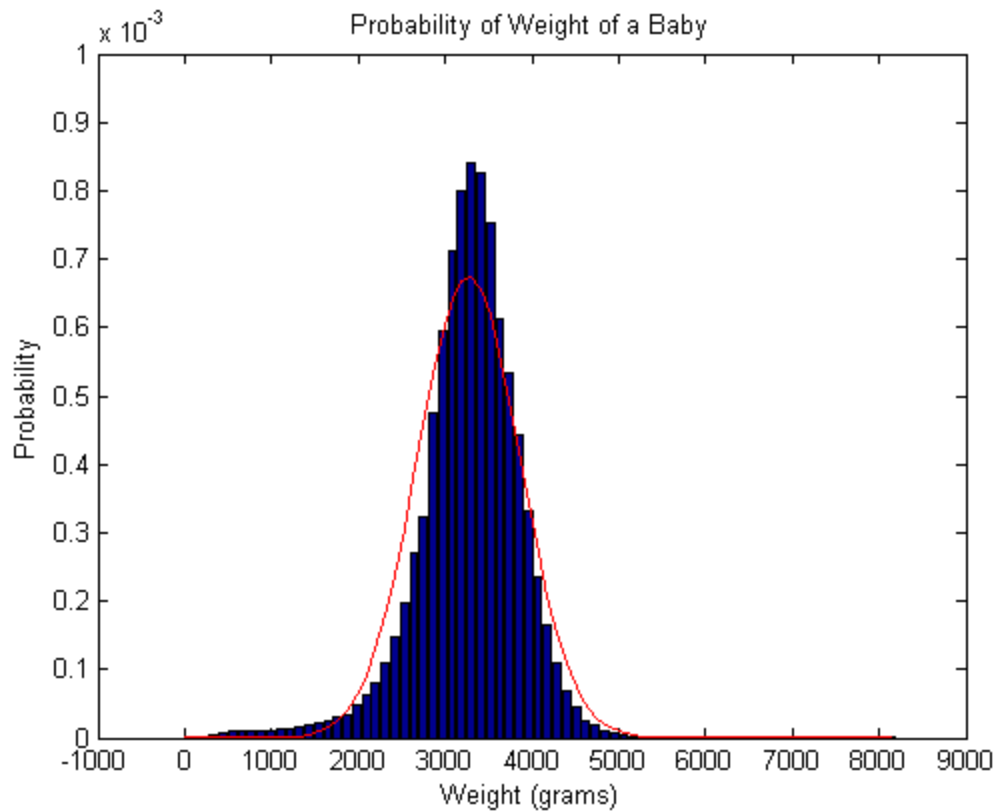
% Plot
figure(1);
bar(x, H);
hold on;
title('Probability of Weight of a Baby');
xlabel('Weight (grams)');
ylabel('Probability');

% Calculate mean
meanBWEIGHT = mean(BWEIGHT);
fprintf('Mean of Birth Weights: %2.f \n', meanBWEIGHT);

% Caculate Standard Deviation
stdBWEIGHT = std(BWEIGHT);
fprintf('Standard Deviation of Birth weights: %2.f \n', stdBWEIGHT);

% Calculate and plot Normal Distribution
NormDist = (1/(sqrt(2*pi)*stdBWEIGHT))...
    *exp(-((x-meanBWEIGHT).^2)/(2*stdBWEIGHT^2));
plot(x, NormDist, 'r');

    Mean of Birth Weights: 3272
    Standard Deviation of Birth weights: 590
```



Probability Distribution of Gestation > 37

```
WeightStep = 0:110:9000;

index = (baby(:,7)>=37) & (baby(:,7)~=99);
WGestGreater37 = baby(index,2);

[H, x] = hist(WGestGreater37, WeightStep);
H = H /size(WGestGreater37, 1)/110;

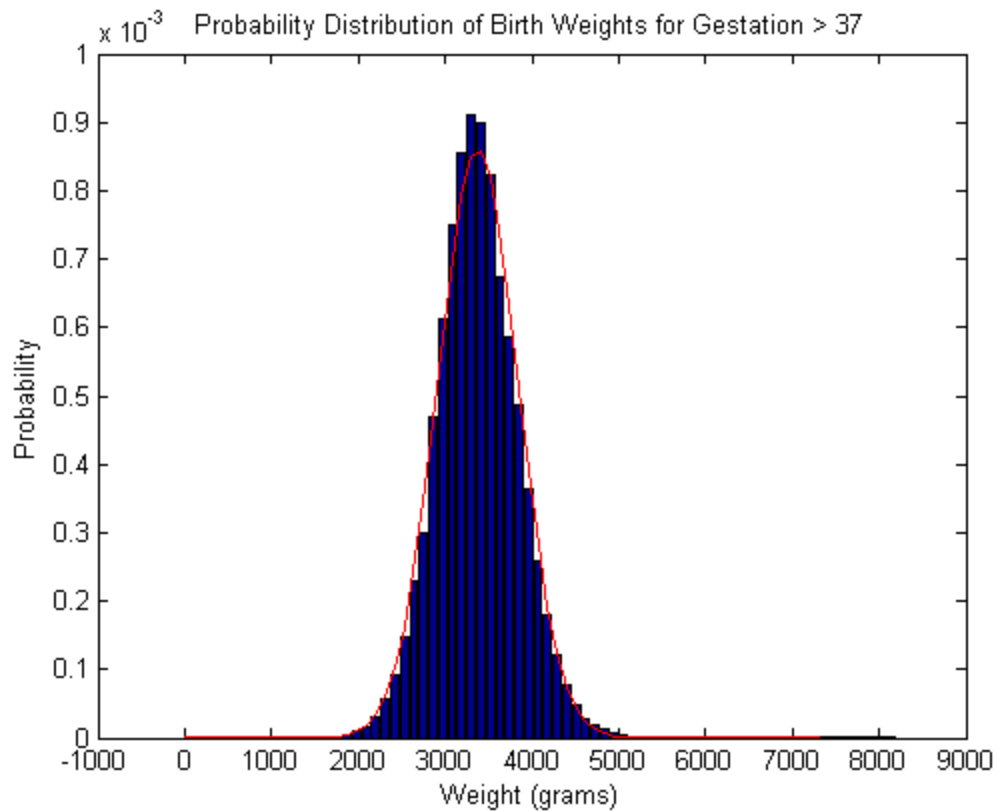
figure(2);
bar(x, H);
hold on;
title('Probability Distribution of Birth Weights for Gestation > 37');
xlabel('Weight (grams)');
ylabel('Probability');

% Calculate mean
meanWGestGreater37 = mean(WGestGreater37);

% Caclulate Standard Deviation
stdWGestGreater37 = std(WGestGreater37);

% Calculate and plot Normal Distribution
```

```
NormDist = (1/(sqrt(2*pi)*stdWGestGreater37))...
    *exp(-((x-meanWGestGreater37).^2)/(2*stdWGestGreater37^2));
plot(x, NormDist, 'r');
```



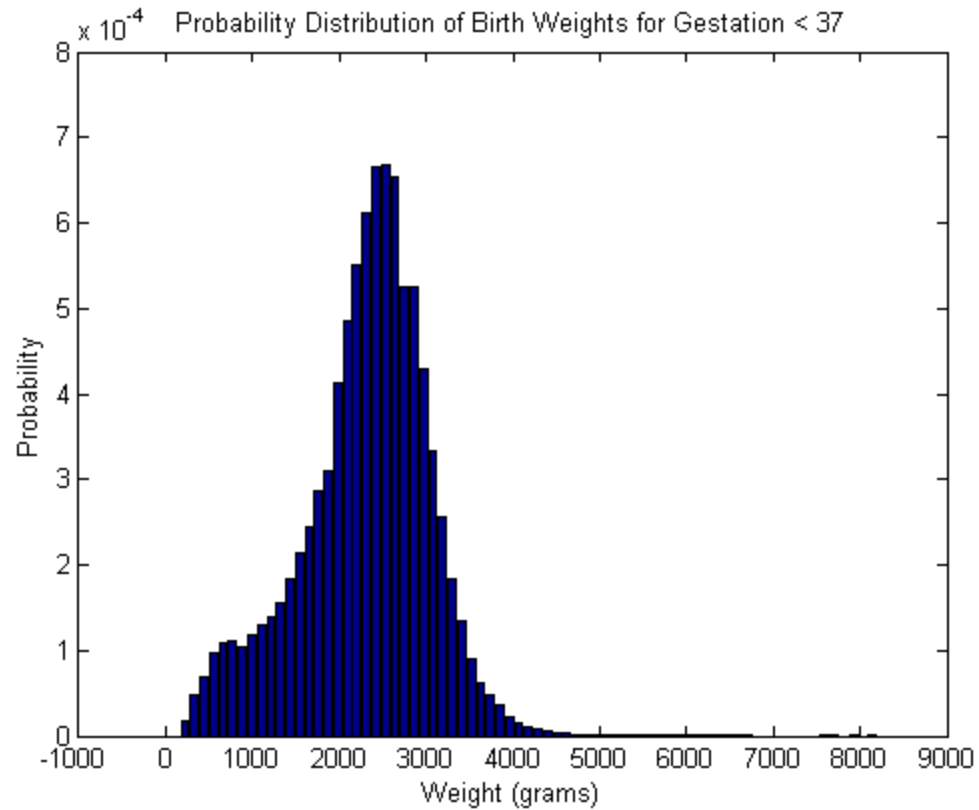
Probability Distribution with Gestation < 37

```
WeightStep = 0:110:9000;

index = (baby(:,7)<37);
WGestGreater37 = baby(index,2);

[H, x] = hist(WGestGreater37, WeightStep);
H = H /size(WGestGreater37, 1)/110;

figure(3);
bar(x, H);
hold on;
title('Probability Distribution of Birth Weights for Gestation < 37');
xlabel('Weight (grams)');
ylabel('Probability');
```



Gestation and Birth Weight Joint Distribution

```
figure(4);
plot(GEST/4, BWEIGHT, 'o');
xlabel('Gestation');
ylabel('Birth Weight');
title('Gest vs Birth Weight');

% 3D Plot

n1 = 31;
n2 = 90;

x1 = 17:1:47;
y1 = 50:100:9000;

xr = interp1(x1, 1:numel(x1), GEST, 'nearest');
yr = interp1(y1, 1:numel(y1), BWEIGHT, 'nearest');
z = accumarray([xr yr], 1, [n1, n2]);

figure(5);
surf(z, 'linestyle', 'none');
surf(z, 'Facecolor', 'interp', 'facelighting', 'phong', ...
     'linestyle', 'none');
camlight right;
```

```
colormap cool;
```

```
%Contour Plot
```

```
figure(6)
```

```
contour(z', 10.^(0:0.3:6));
```

```
title('Gestation and Birth Weight Joint Probability Distribution');
```

```
ylabel('Baby Weight (dekagrams)')
```

```
xlabel('Gestation Period (weeks)');
```

```
colormap cool;
```

```
%Refined Surface Plot
```

```
figure(7)
```

```
q = log10(z);
```

```
surf(q', 'linestyle', 'none');
```

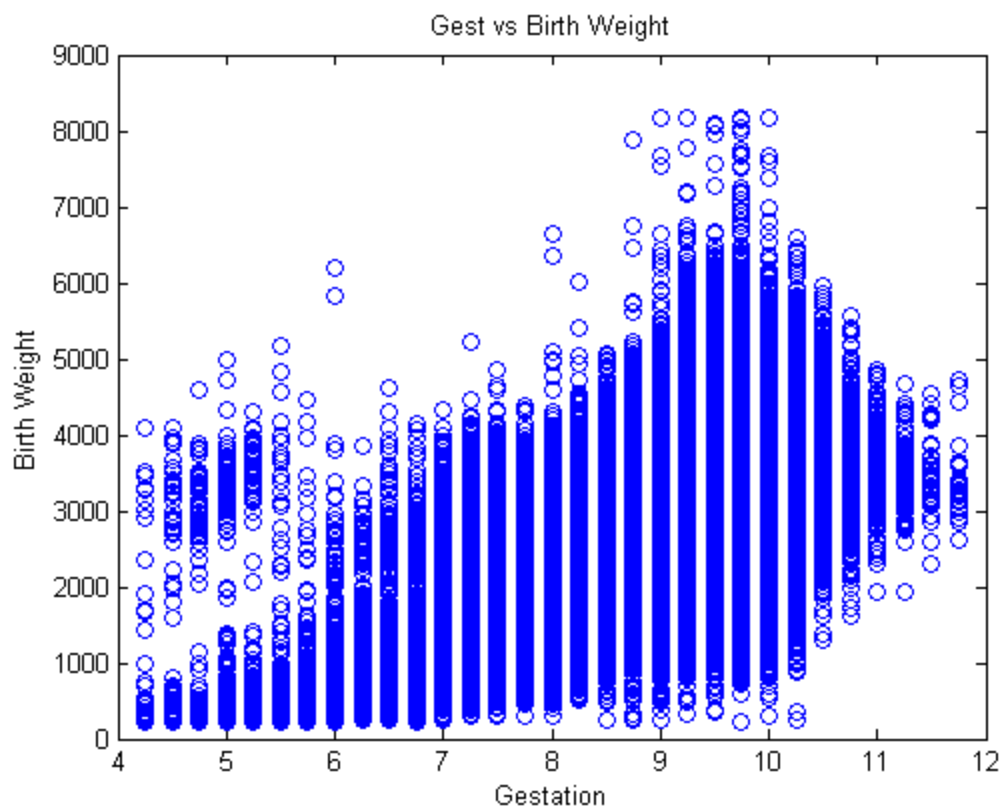
```
surf(q', 'Facecolor', 'interp', 'facelighting', 'phong', 'linestyle','none');
```

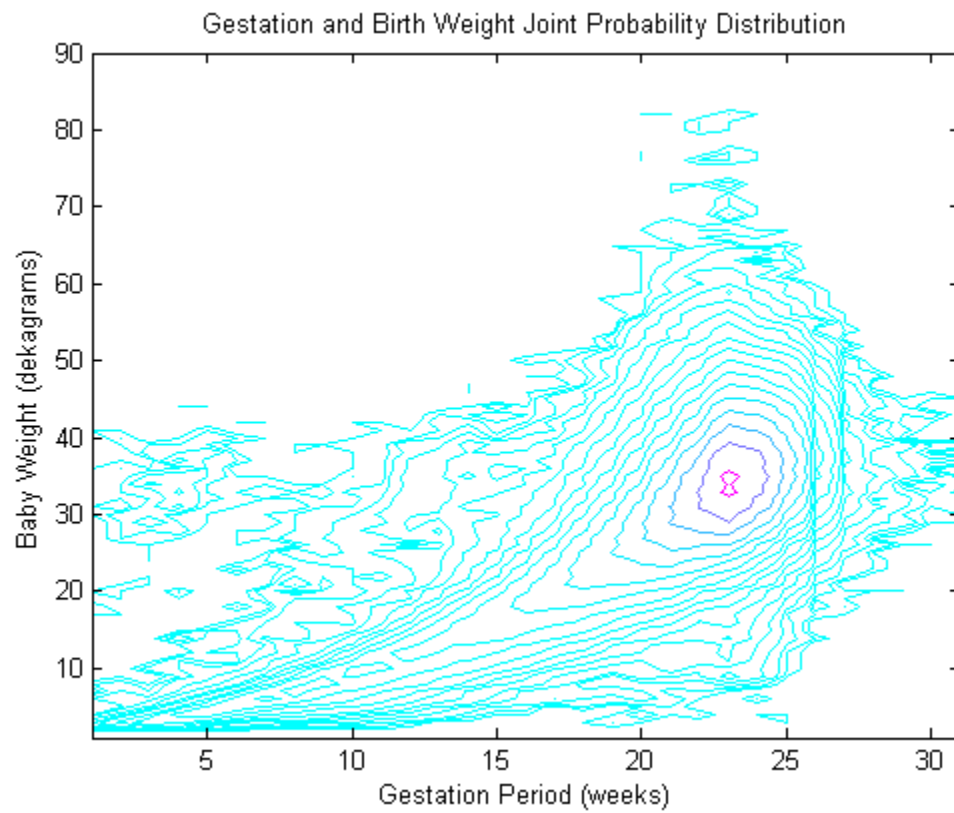
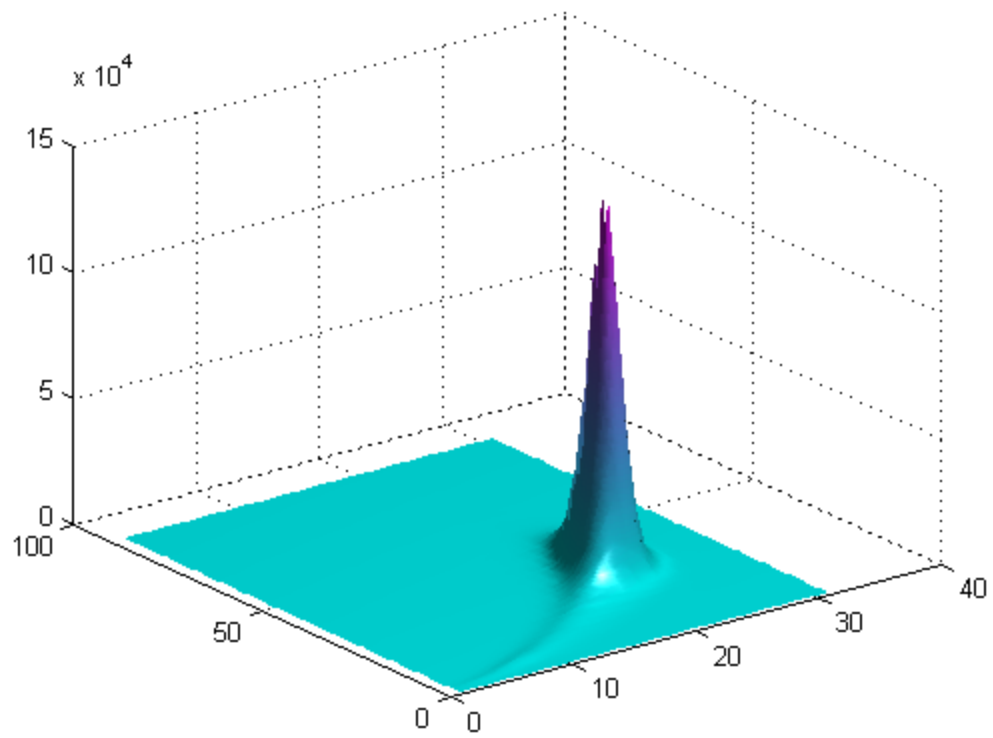
```
xlabel('Gestation Period (weeks)');
```

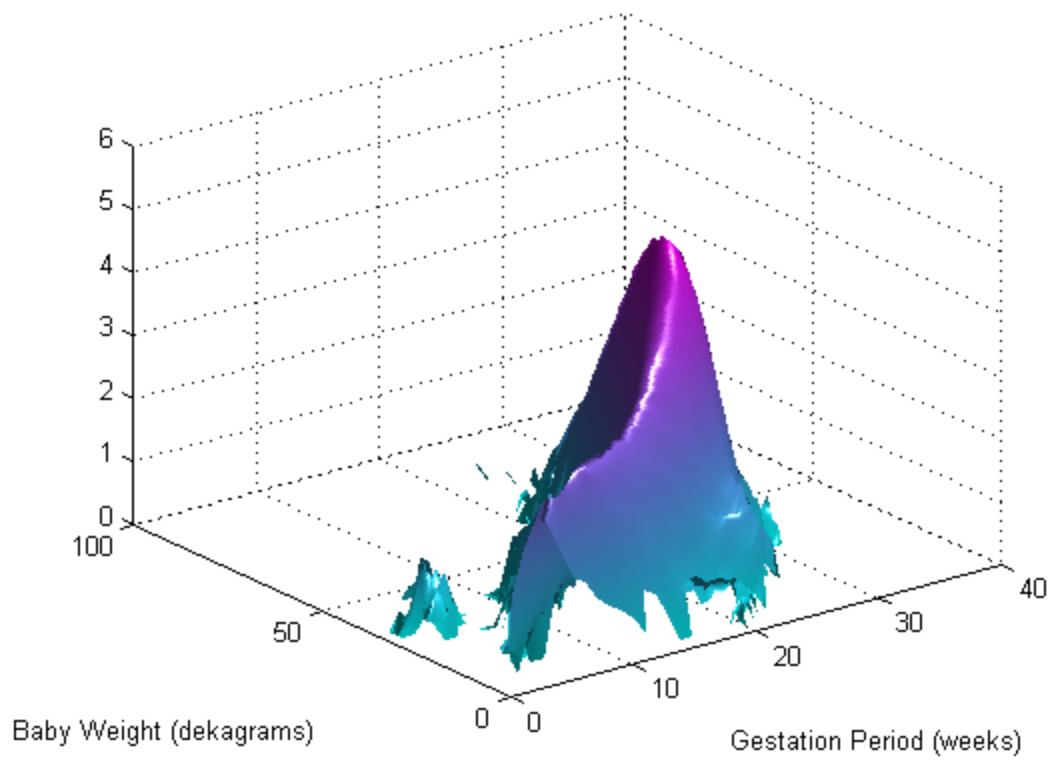
```
ylabel('Baby Weight (dekagrams)');
```

```
camlight right;
```

```
colormap cool;
```







```
% End File
```

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