# Bangladesh University of Engineering and Technology

## EEE 212

## Numerical Technique Laboratory

Experiment No.: 1 & 2

Name of the Experiment: Introduction to MATLAB

Department: EEE

Section: C1

Group: 01

Student No.: 1406131

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Date of Performance: September 3, 2016

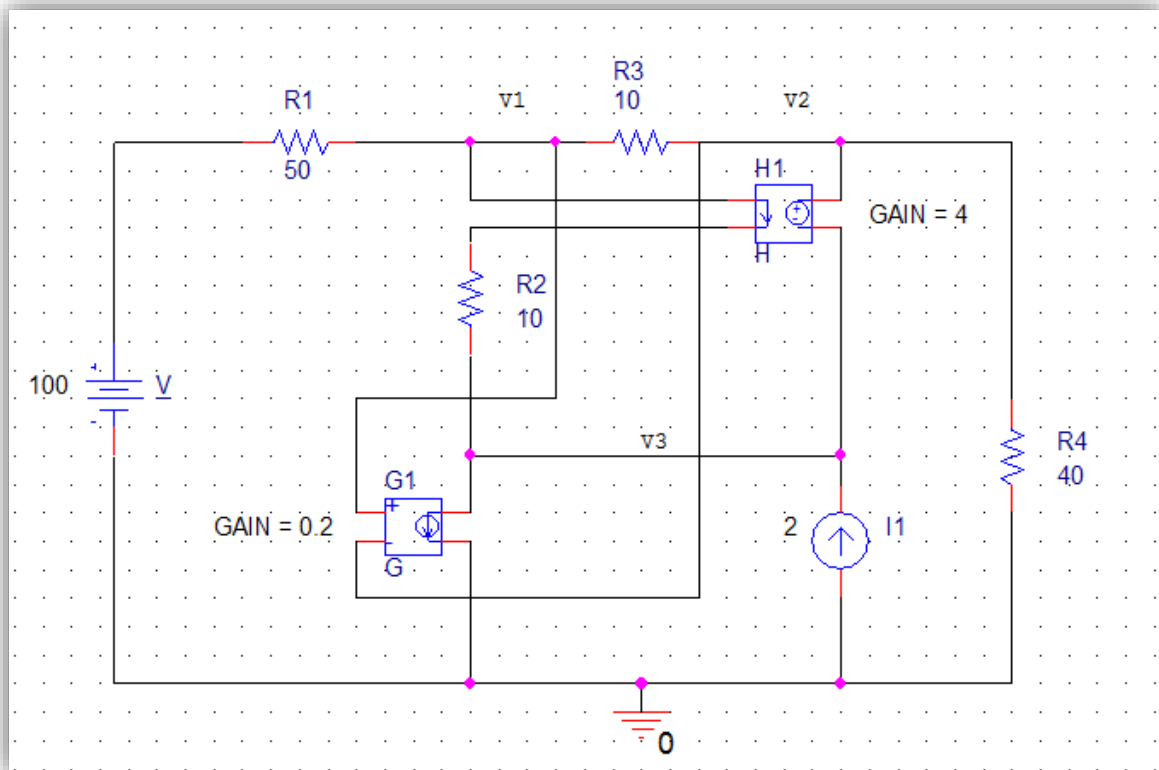Date of Submission: September 16, 2016

# Solving circuit using MATLAB :



Figure 1 : Schematics of the Circuit.

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
A = [ 11 -5 -5 ; 0 -3 4 ; 2 -5 3 ] ; % coefficient matrix
b = [100 ; 80 ; 0 ] ;                    % constant matrix
v= A\b ;              % solution of the circuit. v is a column vector that
                      % includes v1,v2,v3 of the circuit
vnot = v(1) - v(2) ; % voltage between node v1 and v2
inot = ( v(1)-v(3) ) / 10 ; % current through resistance R2
disp('vnot : ') ;
disp(vnot) ;
disp('inot : ') ;
disp(inot) ;

% now varying supply voltage
supply_voltage = 0 : .1 : 100 ;
k=1 ; % k is the index number of Vnot and Inot
```

```
for i = 0 : .1 : 100
    b = [i ; 80 ; 0 ] ;    % A  declared before
    v = A\b ;
    vnot = v(1) - v(2) ;
    inot = ( v(1)-v(3) ) / 10 ;
    Vnot(k) = vnot ;        % Vnot and Inot keeps all the value of vnot and
    Inot(k) = inot ;        % inot for every iteration
    k = k + 1 ;
end

p1 = plot( supply_voltage , Vnot ,'LineWidth',2,'Color','r') ;
hold on ;
p2 = plot( supply_voltage , Inot, 'Linewidth',2,'Color','b') ;
xlabel('Supply Voltage','FontWeight','Bold') ;
ylabel('Vnot and Inot','FontWeight','Bold');
legend([p1,p2],'Vont','Inot','Location','Northwest') ;
grid on ;
title('Different value of Inot and Vnot for DC sweeping Supply Voltage');
```

## Command Window Output:
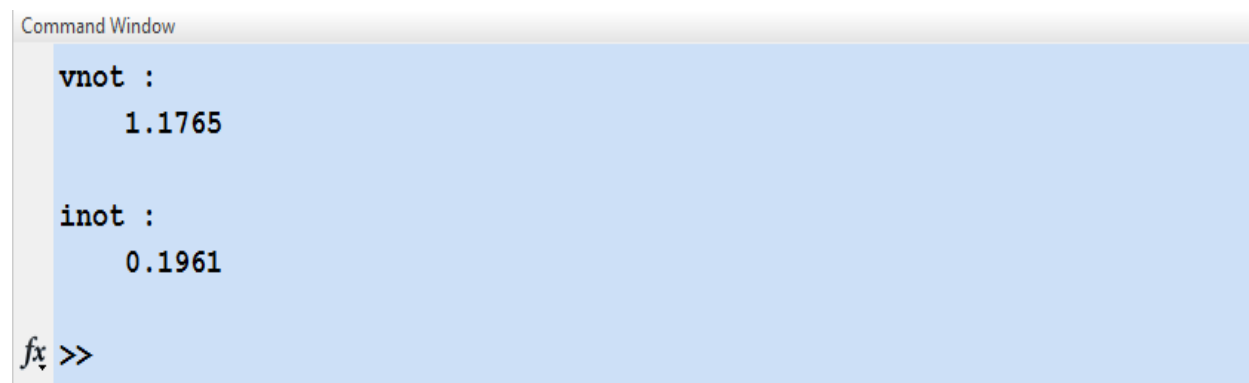
vnot: 1.1765

inot: .1961



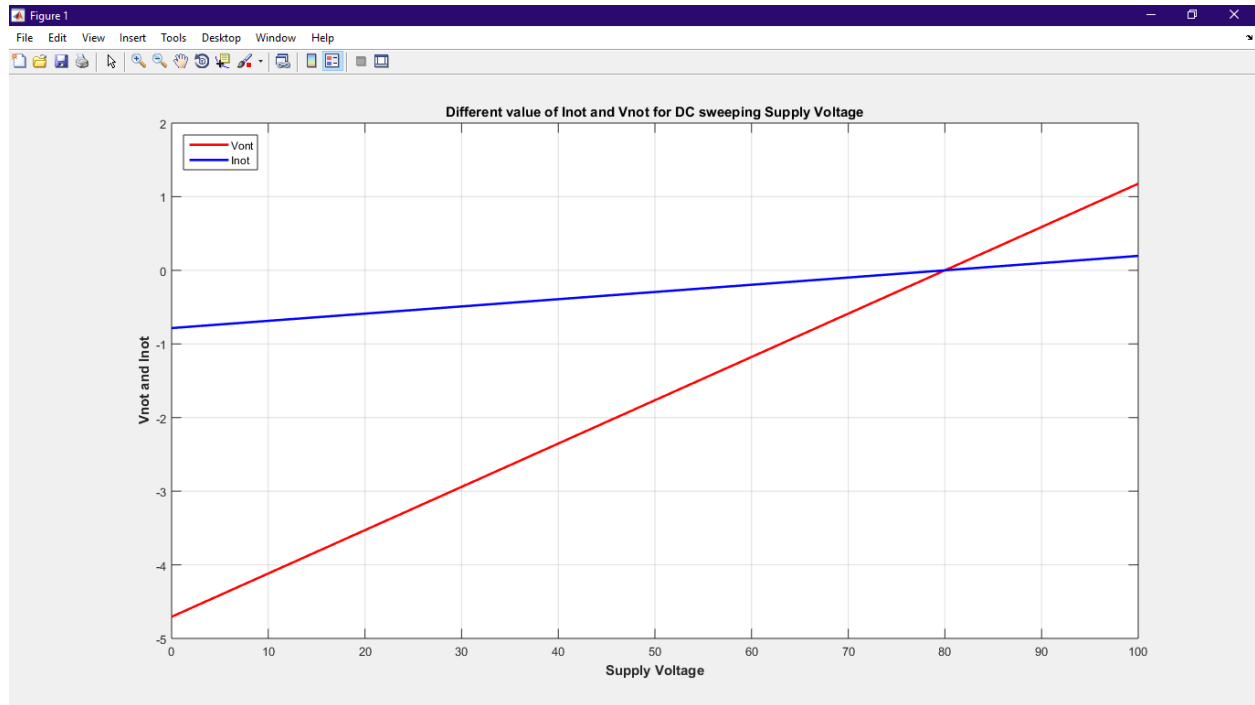Figure 2 : Command Window Output

Output:



Figure 3 : Variation in Vnot and Inot

# Line Plot 1:

Code:

```
clear all , close all;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Zimbabwe 3rd ODI 2015
over = 1:50 ;
bd_run_rate =[4.00 2.00 3.00 3.75 4.20 5.00 4.28 4.50 4.11 4.70 5.18 ...
              5.00 4.84 4.71 4.66 4.50 4.52 4.55 4.47 4.50 4.52 4.31 ...
              4.30 4.33 4.40 4.65 4.92 5.00 4.89 4.96 5.00 5.12 5.00 ...
              5.08 5.00 5.05 5.05 5.00 5.05 5.12 5.07 5.26 5.20 5.13 ...
              5.24 5.36 5.44 5.47 5.48 5.52 ] ;

plot(over,bd_run_rate,'LineWidth',2.5,'Color',[0 .5 0]);
hold on ;
bd_wic_over= [30 35 41 43 44 44 48 50 50] ; % these are the over that
wic_run= 1: length(bd_wic_over);             % contain wicket

for i = 1: length(bd_wic_over) % getting the run rate of the overs that
    wic_run(i) = bd_run_rate(bd_wic_over(i)) ; % contain wicket
end
wic_run(1,6) = wic_run(1,6) + .2 ; % increase run rate that corresponds
wic_run(1,9) = wic_run(1,9) + .2 ; % more than one wicket to get clear
                                   % graphical view

% ploting wickets of Bangladesh in the run rate vs over graph
% wickets are shown as 'O' character

bd = plot(bd_wic_over , wic_run,'O','MarkerFaceColor','w',...
    'MarkerEdgeColor',[0 .5 0],'MarkerSize',7,'LineWidth',1.5 );

zim_over = 1 : 44 ;
zim_run_rate= [4.00 7.00 7.66 6.50 6.00 6.33 6.42 5.75 5.77 5.60 5.45 ...
               5.58 5.61 5.50 5.53 5.37 5.47 5.61 5.63 5.50 5.57 5.50 ...
               5.52 5.41 5.40 5.42 5.37 5.28 5.17 5.06 5.03 5.25 5.21 ...
               5.20 5.20 5.16 5.10 5.13 5.07 5.17 5.12 5.07 4.97 4.94 ] ;

plot(zim_over,zim_run_rate,'LineWidth',2.5,'Color','r');
zim_wic_over= [1 7 9 23 36 37 41 41 43 44] ;
wic_run= 1: length(zim_wic_over);
for i = 1: length(zim_wic_over); % getting the run rate of the overs that
    wic_run(i) = zim_run_rate(zim_wic_over(i)) ; % contain wicket
end
wic_run(1,8) = wic_run(1,9) - .085 ; % decrease run rate that corrensponds
                                     % more than one wicket to get clear
                                     % graphical view
```

```matlab
% ploting wickets of Zimbabwe in the run rate vs over graph
% wickets are shown as 'O' character
zim = plot(zim_wic_over , wic_run,'O','MarkerFaceColor','w',...
      'MarkerEdgeColor','r','MarkerSize',7,'LineWidth',1.5 );
% adding information in the graph
title('Bangladesh vs Zimbabwe 3rd ODI 2015','FontWeight','Bold') ;
xlabel('Overs','FontWeight','Bold') ;
ylabel('Run rate','FontWeight','Bold') ;
axis([1 50 0 9]);
text(20.5,8.5,'Over vs Run rate','FontWeight','Bold') ;
legend([bd zim],'Bangladesh','Zimbabwe','Orientation',...
      'horizontal','Location','South');
```
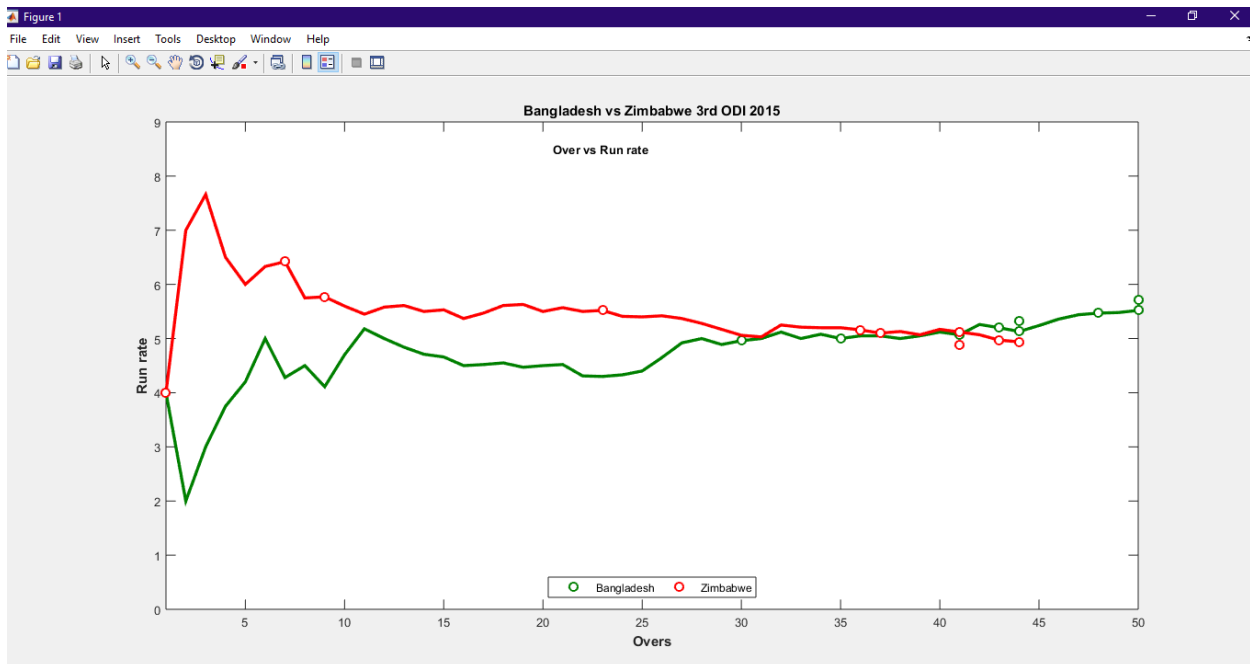
Output:



Figure 4 : Output of Line plot 1

# Line plot 2:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Zimbabwe 3rd ODI 2015
over = 1:50 ;
bd_run =[ 4 4 9 15 21 30 30 36 37 47 57 60 63 66 70 72 77 82 85 90 95 ...
          95 99 104 110 121 133 140 142 149 155 164 165 173 175 182 187 ...
          190 197 205 208 221 224 226 236 247 256 263 269 276 ] ;

plot(over,bd_run,'LineWidth',2.5,'Color',[0 .5 0]);
hold on ;
bd_wic_over= [30 35 41 43 44 44 48 50 50] ; % these are the over that
wic_run= 1: length(bd_wic_over);            % contain wicket

for i = 1: length(bd_wic_over) % getting the run of the overs that
    wic_run(i) = bd_run(bd_wic_over(i)) ; % contain wicket
end
wic_run(1,6) = wic_run(1,6) + .2 ; % increase run that corresponds
wic_run(1,9) = wic_run(1,9) + .2 ; % more than one wicket to get clear
                                   % graphical view

% ploting wickets of Bangladesh in the run vs over graph
% wickets are shown as 'O' character

bd = plot(bd_wic_over , wic_run,'O','MarkerFaceColor','w',...
    'MarkerEdgeColor',[0 .5 0],'MarkerSize',7,'LineWidth',1.5 );

zim_over = 1 : 44 ;
zim_run=[4 14 23 26 30 38 45 46 52 56 60 67 73 77 83 86 93 101 107 110 ...
         117 121 127 130 135 141 145 148 150 152 156 168 172 177 182 186 ...
         189 195 198 207 210 213 214 215 ] ;

plot(zim_over,zim_run,'LineWidth',2.5,'Color','r');
zim_wic_over= [1 7 9 23 36 37 41 41 43 44] ;
wic_run= 1: length(zim_wic_over);
for i = 1: length(zim_wic_over); % getting the run of the overs that
    wic_run(i) = zim_run(zim_wic_over(i)) ; % contain wicket
end
wic_run(1,8) = wic_run(1,9) - .085 ; % decrease run that corrensponds
                                     % more than one wicket to get clear
                                     % graphical view

% ploting wickets of Zimbabwe in the run vs over graph
% wickets are shown as 'O' character
zim = plot(zim_wic_over , wic_run,'O','MarkerFaceColor','w',...
```

```
     'MarkerEdgeColor','r','MarkerSize',7,'LineWidth',1.5 );
% adding information in the graph
title('Bangladesh vs Zimbabwe 3rd ODI 2015') ;
xlabel('Overs','FontWeight','Bold') ;
ylabel('Run','FontWeight','Bold') ;
axis([1 50 0 300]);
text(23,275,'Over vs Run','FontWeight','Bold') ;
legend([bd zim],'Bangladesh','Zimbabwe','Orientation',...
     'horizontal','Location','South');
```
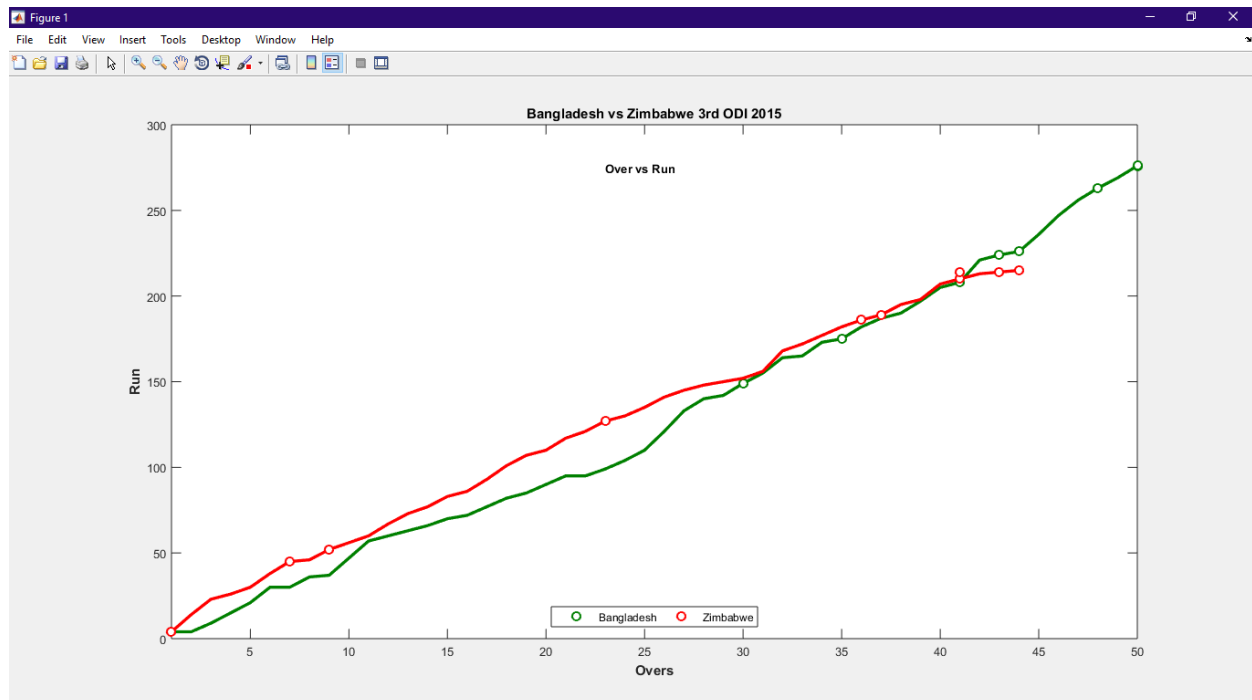
Output:



Figure 5 : Output of Line plot 2

# Line plot 3:

Code:

```matlab
clear all , close all ;

clc , clf ;

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Pakistan 2nd ODI 2015

over = 1: 38 ;
req_run_rate = [4.79 4.79 4.63 4.56 4.48 4.29 4.32 4.38 4.14 3.92 3.92 ...
                3.89 3.91 3.88 4.00 4.05 4.03 3.96 3.80 3.76 3.75 3.39 ...
                3.44 3.50 3.08 3.08 3.04 2.95 2.80 2.85 2.84 2.66 2.52 ...
                2.50 2.00 1.57 1.23 0.08 ] ;

wicket_fall_over = [3 15 37] ; % over that contains wickets
wicket_fall_over_req_run_rate = [0 0 0] ; % initializing
wicket_fall = zeros(1,38) ;

for i = 1:3
   wicket_fall_over_req_run_rate(i) = req_run_rate(wicket_fall_over(i)) ;
end                             % collecting the run rate of the over that
                                % contains wicket

p1 = plot(over,req_run_rate,'LineWidth',2,'Color',[0 .5 0]) ;
hold on ;                       % plotting over vs required run rate

p2 = plot (wicket_fall_over,wicket_fall_over_req_run_rate,'O','LineWidth',...
        2,'MarkerFaceColor','w','MarkerEdgeColor','b') ;
                                % plotting wickets
axis([1 40 .07 5]);

% adding inoformation
xlabel('Overs','FontWeight','Bold');
ylabel('Required Run Rate','FontWeight','Bold');

legend([p1 p2],'Required Run Rate','Wicket Fall');
title('Bangladesh vs Pakistan 2nd ODI 2015','FontWeight','Bold');
text(13,.3,'Bangladesh won by 7 wickets (with 71 balls remaining)',...
    'FontWeight','Bold');
```
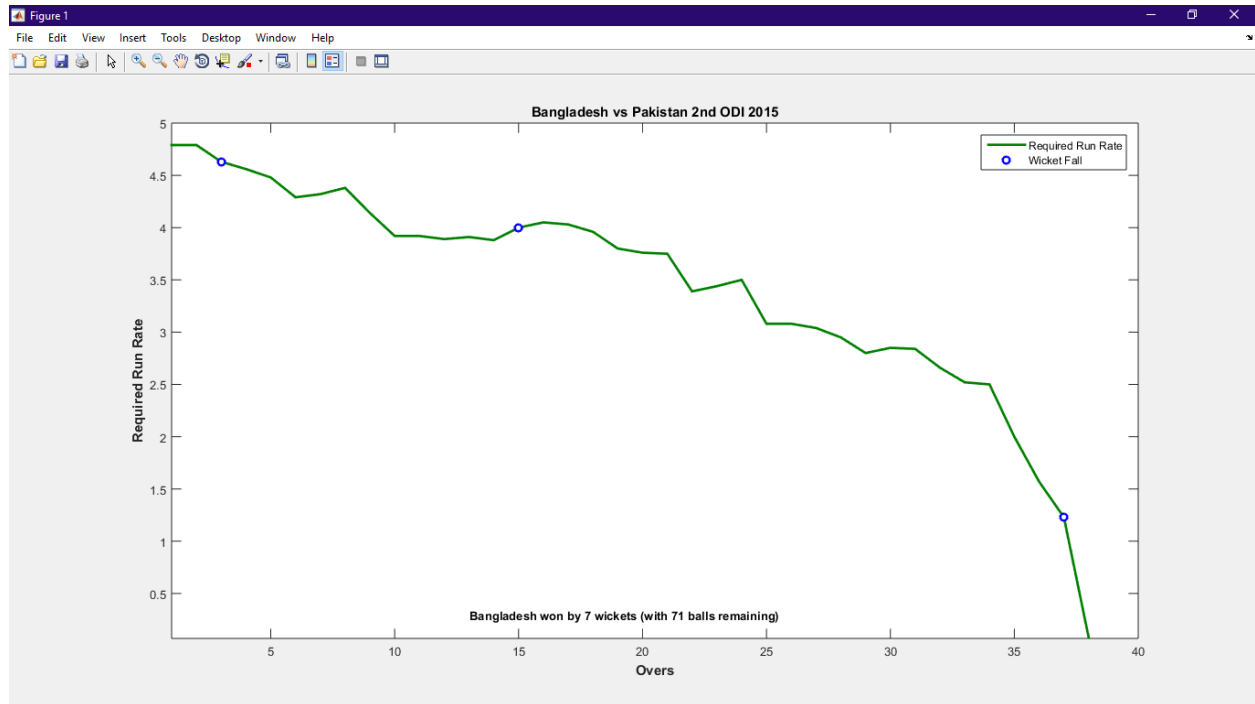
Output:



Figure 6 : Output of Line Plot 3

Line Plot 4:

Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs India 2nd ODI 2015

ind_over = 1 : 45;
ind_per_over_run = [ 3 8 5 5 7 4 5 5 12 11 3 5 1 7 7 4 3 3 2 4 5 1 4 7 ...
                  3 1 5 2 6 4 5 1 4 3 7 2 3 2 4 6 3 2 9 3 4 ];

bd_over = 1: 38;
bd_per_over_run = [ 6 10 8 3 6 1 1 4 2 8 1 7 3 5 6 15 0 5 7 1 7 3 3 3 2 ...
                  16 8 4 6 3 9 5 3 3 7 1 12 6 ] ;

p1 = plot (ind_over , ind_per_over_run,'LineWidth',2,'Color','b') ;
hold on ;

p2 = plot (bd_over,bd_per_over_run,'LineWidth',2,'Color',[0 .5 0]);
axis([ 1 45  0 18]);

% adding information
legend ([p2 p1],'Bangladesh','India') ;
grid on ;
xlabel ('Overs');
ylabel ('Per Over Run');
title ('Bangladesh vs India 2nd ODI 2015');
text (19.7,17,'Per Over Run Comparison','FontWeight','Bold',...
    'BackgroundColor',[.8 .88 .97]);

text (3.2,15.83,'Bangladesh won by 6 wickets') ;
text (2.23,15.1,'(with 54 balls remaining) (D/L method)') ;
```
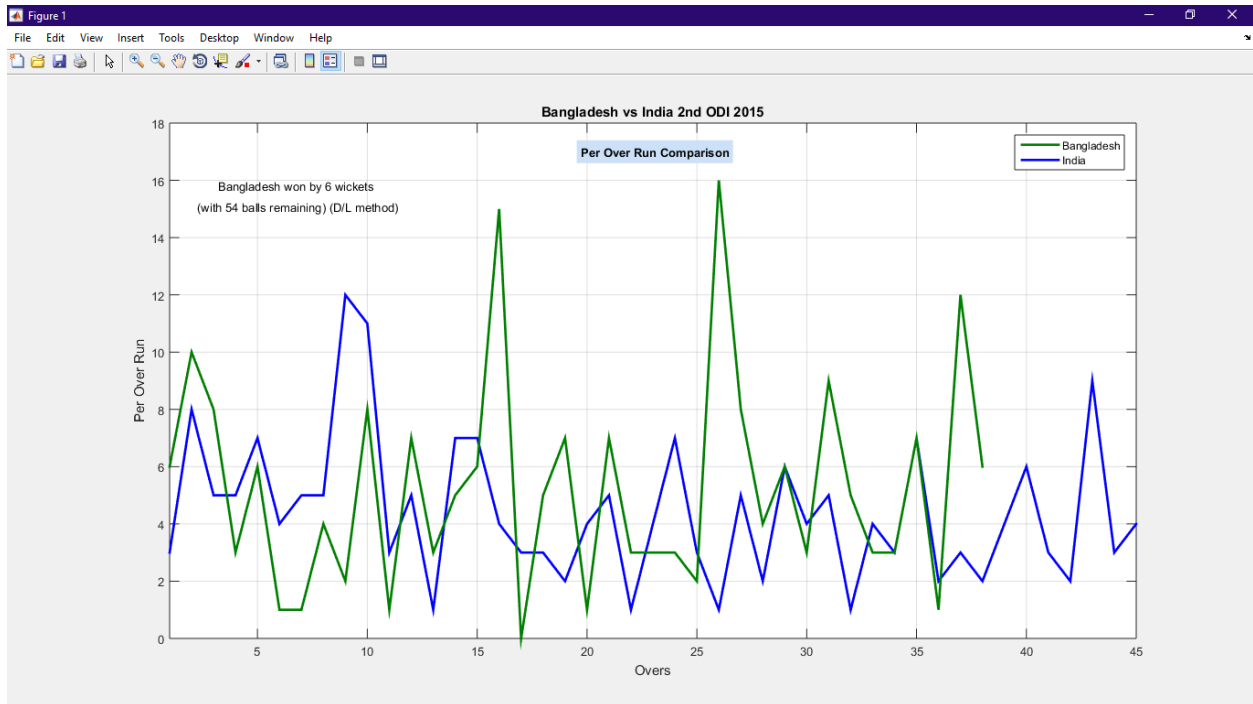
Output:



Figure 7 : Output of Line plot 4

# Line Plot 5:

## Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza's Economy rate in last 10 winning match
mortaza_ecn = [ 4.80 6.50 4.40 5.30 5.00 3.40 5.80 2.16 5.22 4.44 ] ;
over= [ 10.0 8.0 10.0 10.0 7.0 5.0 5.0 6.0 9.0 9.0 ] ;
match = 1: 10 ;
plot3( over , match , mortaza_ecn, 'LineWidth', 2 , 'Color','r' ) ;
% adding information
xlabel('Over','FontWeight','Bold');
ylabel('Match','FontWeight','Bold');
zlabel('Economy Rate','FontWeight','Bold');

axis([2 10 0 10 1 8]);
view(97.5,36.44) ;
grid on ;
title('Mashrafe Mortaza''s Economy rate in last 10 winning match',...
      'FontWeight','Bold');
set(gcf,'Color',[.76 .87 .78] );
set(gca,'Color',[1 1 .6] ) ;
```
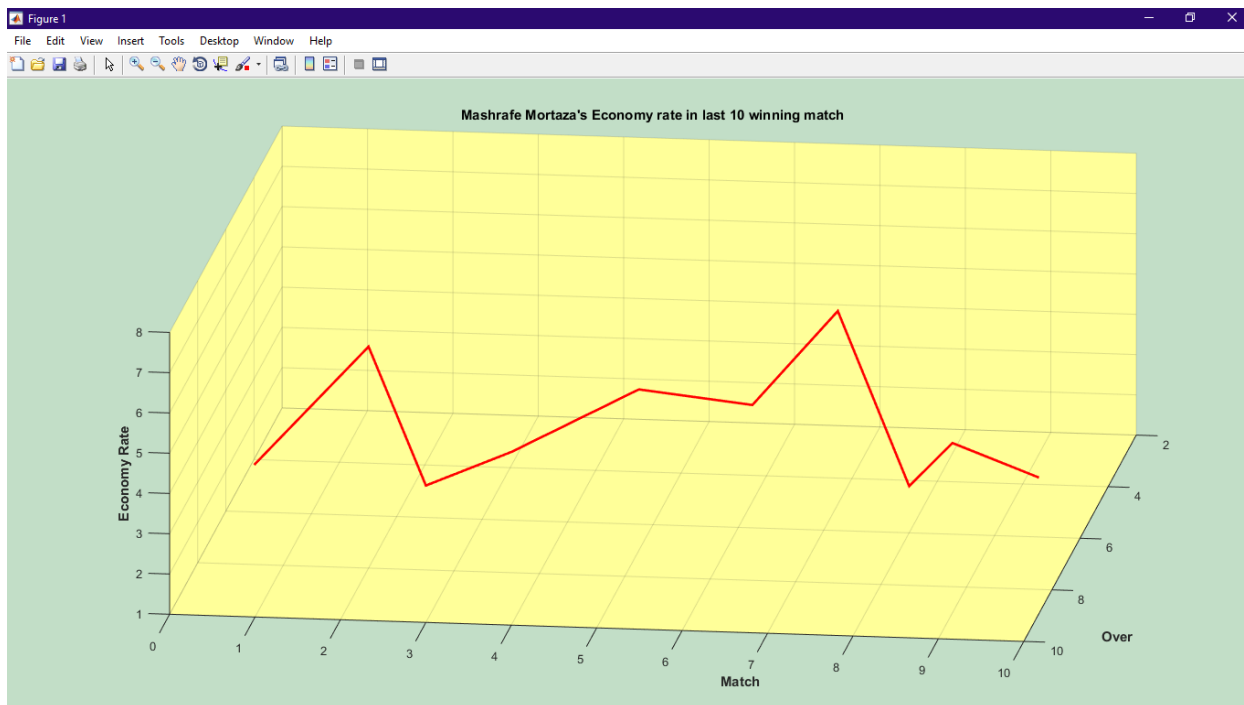
## Output:



Figure 8 : Output of Line Plot 5

# Bar Plot 1:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Tamim Iqbal in last 10 winning match

match = 1: 10 ;
tamim_iqbal_run = [ 132 116 64 60 13 5 61 40 19 73 ] ;

bar (match , tamim_iqbal_run ,'FaceColor',[0 .5 0]) ;

for i = 1 : 10                          % showing score in the bar graph
    c = num2str(tamim_iqbal_run(i));% number to string conversion

    x = i ;
                                        % of the bar graph
    y = (tamim_iqbal_run(i)+ 5 ) ;   % plus 5 for showing run above bar graph
    text (x,y,c,'fontweight','bold');
end

axis([0 11 0 150]);
xlabel('Last 10 Winning Match','fontweight','bold') ;
ylabel ('Run','fontweight','bold');
title('Tamim Iqbal in last 10 winning match','fontweight','bold')
```
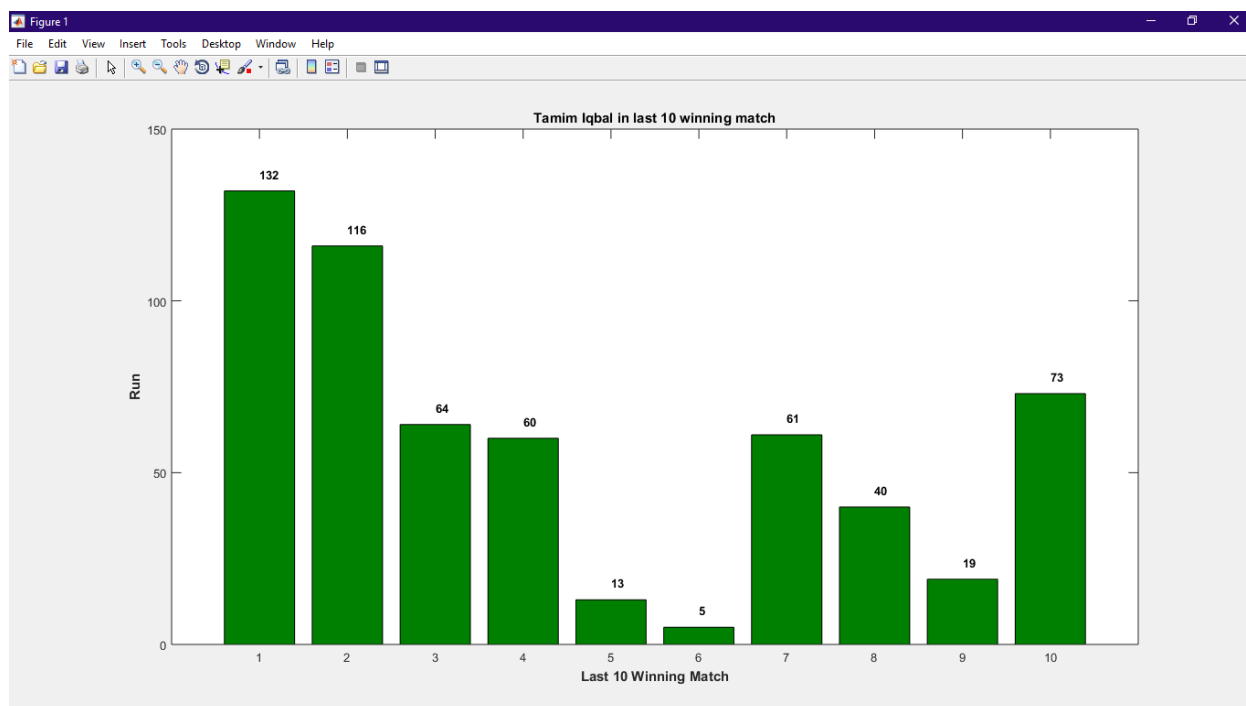
Output:



Figure 9 : Output of Bar plot 1

# Bar Plot 2:

## Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mahmudullah Riad in last 10 winning match

match = 1: 10 ;
mahmudullah_run = [ 62 62; 103 138 ; 5 18 ; 17 28 ; 4 10; 50 64 ; 9 20 ;...
                    4 20 ; 52 40 ] ;
% bar3 plot
bar_plot = bar3 ( mahmudullah_run ) ;

% making variation in color
for k = 1: length ( bar_plot )
    zdata = bar_plot(k).ZData ;
    bar_plot(k).CData = zdata ;
    bar_plot(k).FaceColor = 'interp' ;
end

% showing run and ball in the bar graph
for i = 1 : 9
    c_run = num2str( mahmudullah_run(i,1) ) ; % number to string conversion
    c_ball = num2str( mahmudullah_run(i,2) ) ;
    y = i ;
    z_run = (mahmudullah_run(i,1)+ 6 ) ; % plus 6 for showing run above bar
graph
    z_ball = (mahmudullah_run(i,2)+ 6 ) ;

    text ( 1,y,z_run, c_run,'FontWeight','Bold' );
    text ( 2,y,z_ball, c_ball,'FontWeight','Bold' ) ;
end

text(1,11,'Run','FontWeight','Bold');
text(2,11,'Ball','FontWeight','Bold');
ylabel ('Matches','FontWeight','Bold');
title('Mahmudullah Riad in last 10 winning match','FontWeight','Bold')
view(-111.5,40) ;
```
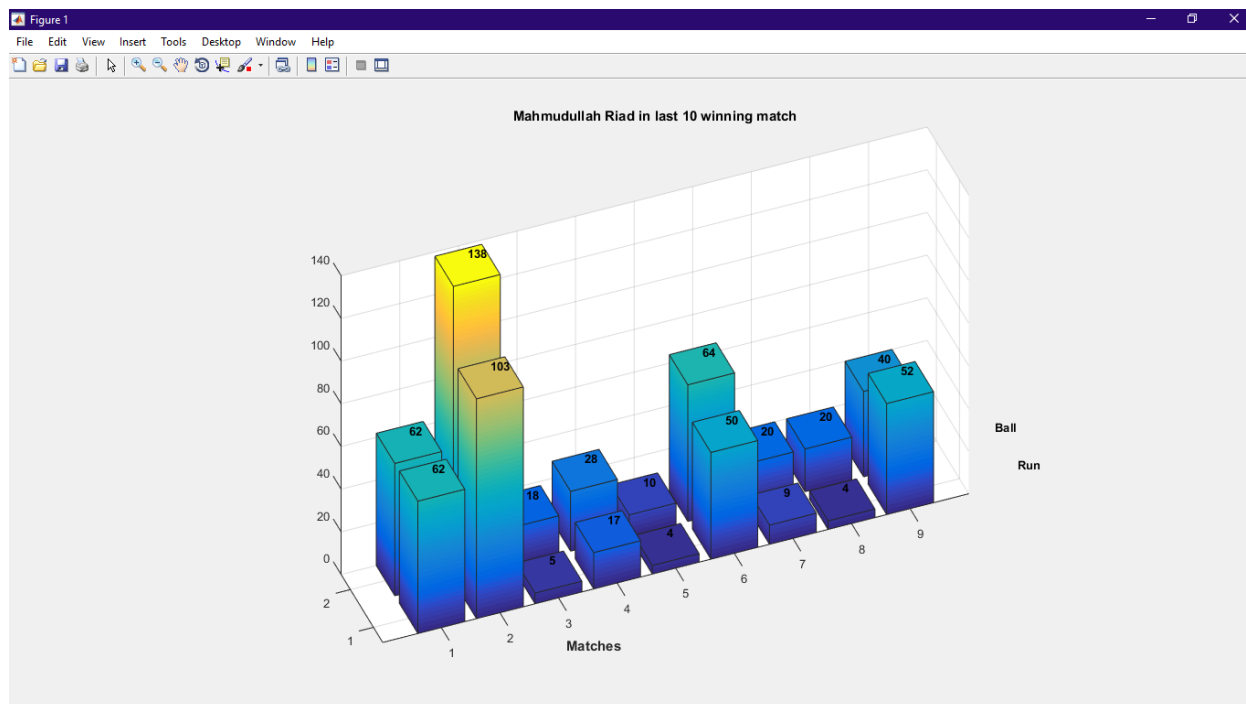
Output:



Figure 10 : Output of Bar plot 2

## Bar Plot 3:

Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% South Africa vs. Bangladehs 3dr ODI
% Soumya Sarker run all around the field
field = ones(1,8) ;
labels = {'Fine-leg (10)','Square-leg (4)','Mid-wicket (32)','Mid-on (6)',...
    'Mid-off (6)','Cover (18)','Point (2)','Third man (12)' };
pie(field,labels) ;
title ('Soumya Sarker Scores all around the ground') ;
set( gcf,'Color',[.76 .87 .78] ) ;
```
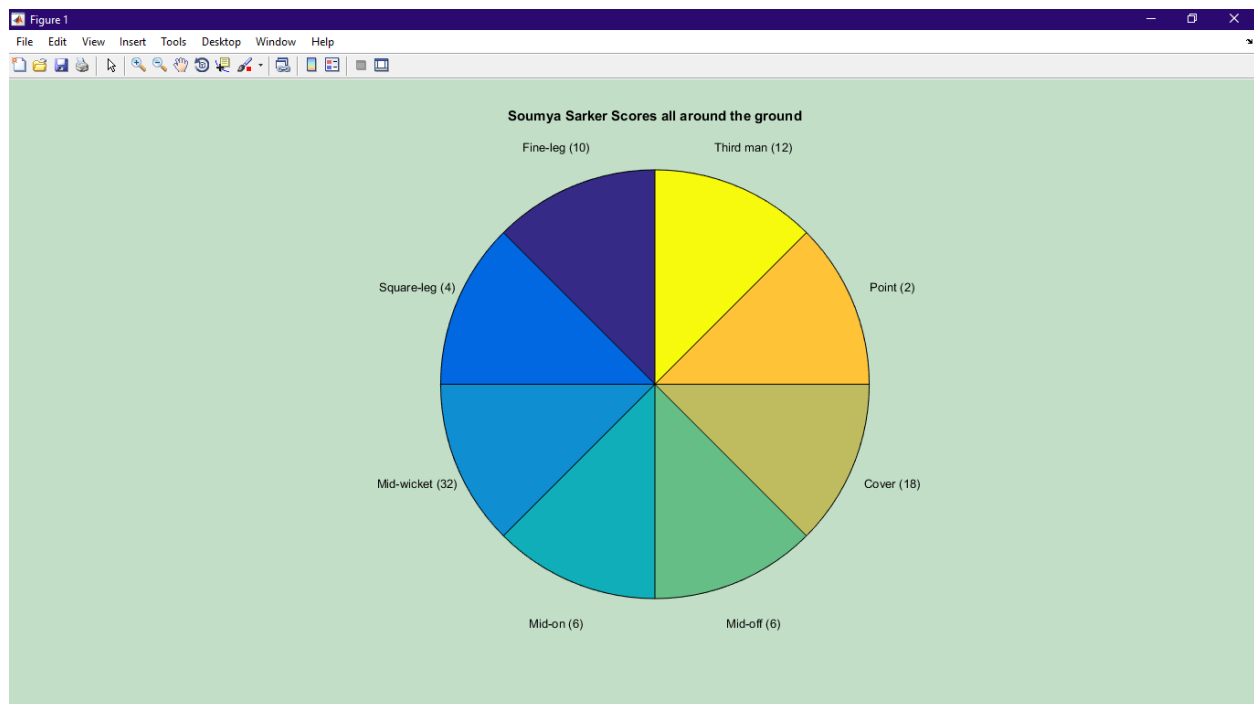
Output:



Figure 11 : Output of Bar plot 3

# Bar Plot 4:

Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs. India 2015 1st ODI

left_y = [9 9 0 3 9 38 12 2 15 45] ;
right_y = [0 2 4 8 26 41 5 4 4 55] ;

left_label = char('Tamim Iqbal 45(43)','Tamim Iqbal 15(20)','Musfiqur Rahim
2(5)',...
    'Musfiqur Rahim 12(14)','Shakib Al Hasan 38(43)','Shakib Al Hasan
9(16)',...
    'M Mortaza 3(6)','M Mortaza 0(0)','M Mortaza 9(7)','M Mortaza 9(5)' );

right_label = char ('Soumya Sarker 54(40)','Liton Das 4(5)','Liton Das
4(8)',...
    'Shakib Al Hasan 5(9)','Sabbir Rahman 41(44)','Nasir Hossain 26(19)',...
    'Nasir Hossain 8(8)','Rubel Hossain 4(5)','Taskin Ahmed 2(5)','M Rahman
0(0)');

total = char('102(83)','21(25)','6(13)','17(23)','83(87)',...
    '38(35)','15(14)','4(5)','12(12)','9(5)') ;

x = 1: 10 ;
% plotting barh
a = barh(x,-left_y,.5);  % plotting left side of the partnership
% removing Baseline
a1 = get(a,'BaseLine') ;
set(a1,'LineStyle','none') ;
hold on;

a = barh(x,right_y,.5);  % plotting right side of the partnership
axis([-60 60 0 11]);
k=10;

for i = 1:10         % adding left side text
    xvalue = -40 ;
    yvalue = k + .5 ;
    k=k-1;
    c =  left_label(i,:) ;
    text(xvalue,yvalue,c,'FontWeight','Bold') ;
end
k=10;

for i = 1:10         % adding right side text
    xvalue = 20 ;
    yvalue = k + .5 ;
    k=k-1;
    c =  right_label(i,:) ;
    text(xvalue,yvalue,c,'FontWeight','Bold') ;
end
```

```
k=10;
for i = 1:10          % adding total partnership in the middle of the plot
    xvalue = -2 ;
    yvalue = k + .55 ;
    k=k-1;
    c =  total(i,:) ;
    text(xvalue,yvalue,c,'FontWeight','Bold') ;
end

axis off;
title('Partnershiop of Bangladesh Batsman');
```
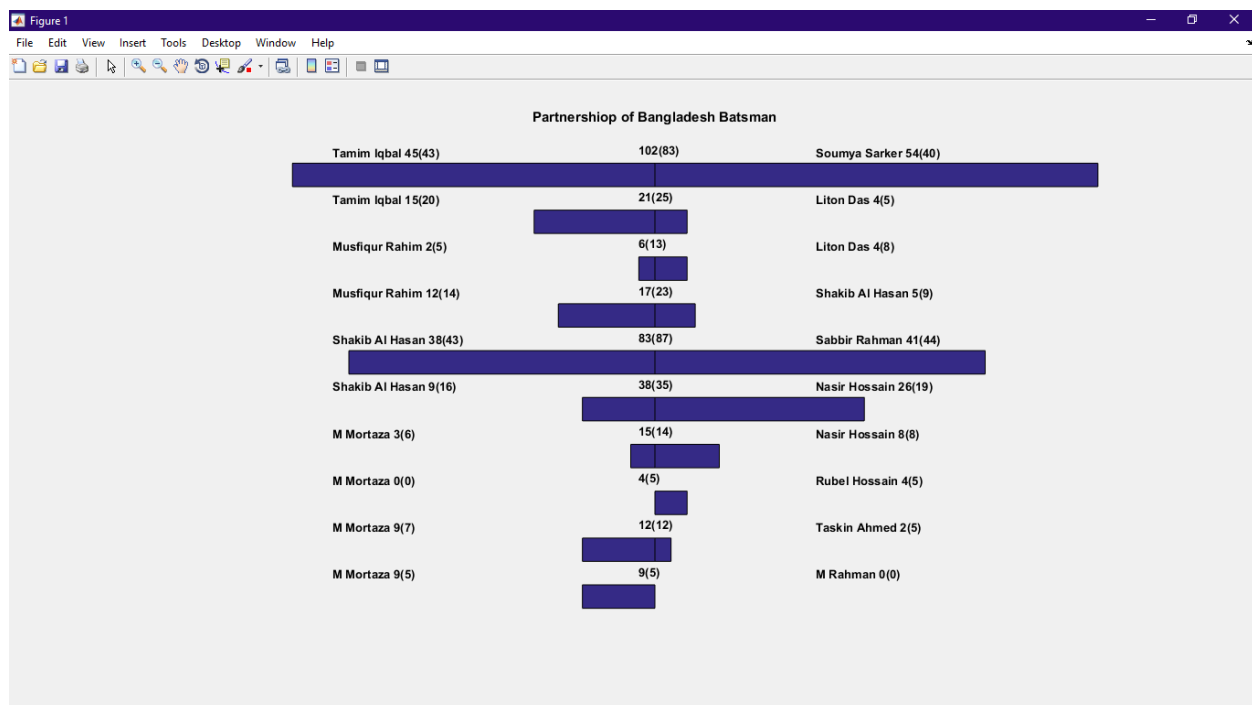
Output:



Figure 12 : Output of Bar plot 4

# Bar Plot 5:

### Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%Bangladesh vs Pakistan 1st ODI 2015

bd_score =[ 2 8 4 6 2 9 6 4 2 1 2 1 1 3 2 1 2 3 7 1 7 6 5 7 12 7 5 17 ...
           4 3 8 10 4 5 14 11 18 11 7 8 5 5 16 11 10 4 7 13 10 12 ] ;

b = bar3(bd_score);     % plotting 3D bar graph
title('Bangladesh Run in Each Over','fontweight','bold');
ylabel('Over','fontweight','bold');
zlabel('Run','fontweight','bold' );
set(b,'FaceColor', 'b' ) ;
ylim([0 51]);    % defining y and z axis limit
zlim([0 20]);
view(-90,34); % changing default azimuth and elevation
```
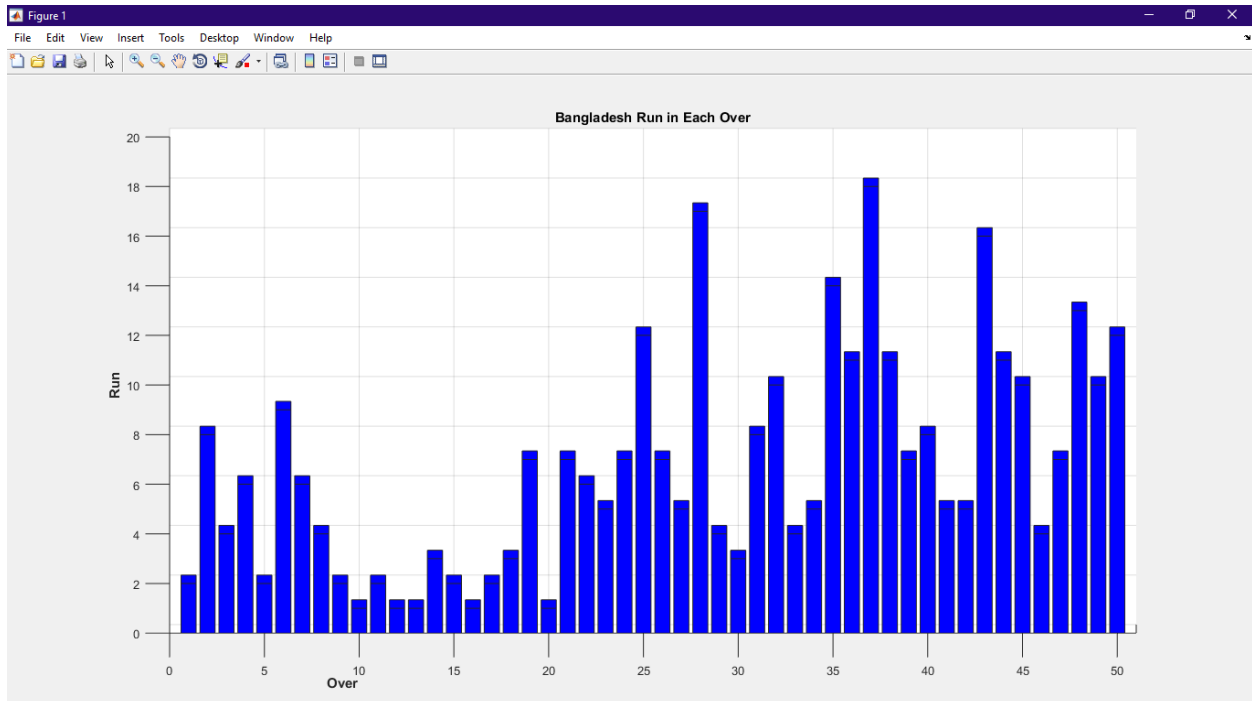
### Output:



Figure 13 : Output of Bar plot 5

# Mesh plot 1:

## Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza's Bowling Average in last 10 winning match
mortaza_given_run = [ 48 52 44 53 17 29 13 47 40 ] ;
wicket = [2 1 2 1 1 1 2 1 1] ;    % without wicket bowling average is invalid
                                  % as in last 6th match mashrafe was
                                  % wicketless so that match score is removed
[run,wic] = meshgrid( mortaza_given_run,wicket );
% finding the Bowling average
bowling_average = run ./ wic ;
% mesh plot
mesh(  bowling_average ,'FaceColor','interp','edgecolor','interp');
% labeling
zlabel('Bowling Avearge','FontWeight','Bold');
% adding detail
title('Bowling Average of Mortaza in last 10 winning matches',...
      'FontWeight','Bold');
view(35.5,58) ;
```
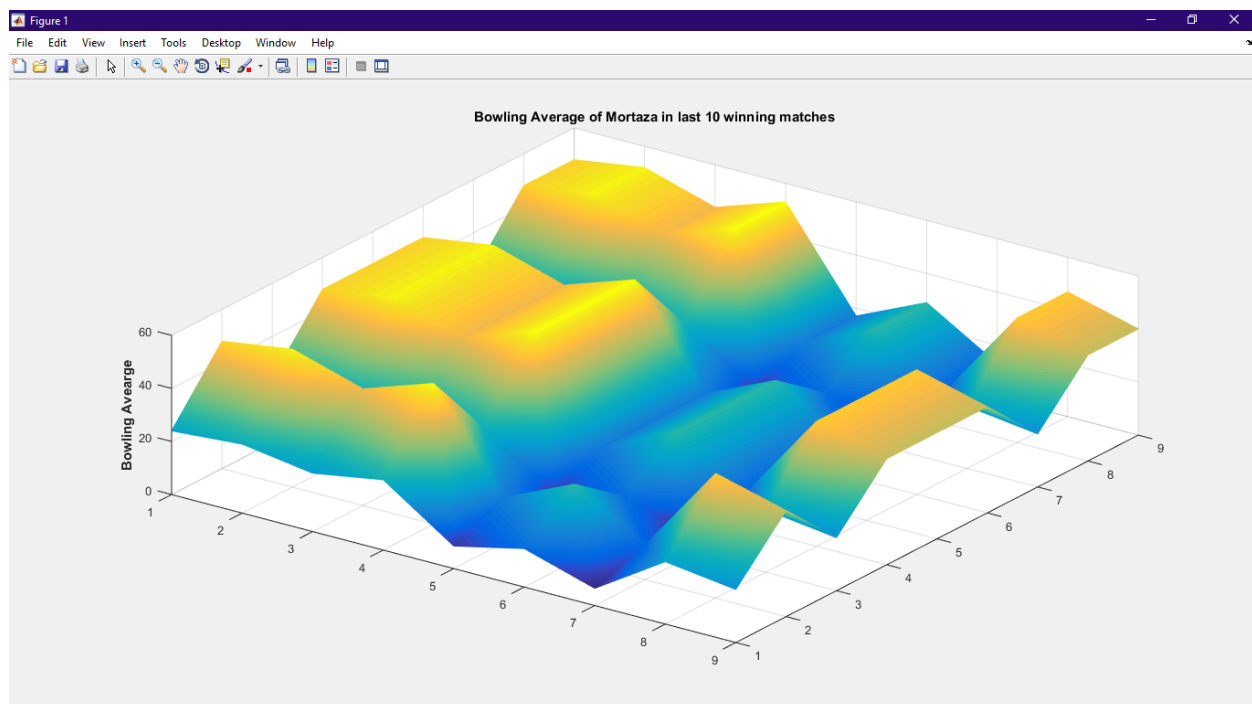
## Output:



Figure 14 : Output of Mesh plot 1

# Mesh plot 2:

## Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Run_rate of Bangladesh in last 10 winning matches
bd_run = [ 329 240 251 307 200 167 170 273 241 276 ] ;
over_played = [ 50 38.167 39.5 49.67 38 27.67 26.167 50 50 50 ] ;

[run , over] = meshgrid( bd_run,over_played );
run_rate = run ./ over;
% mesh plot
mesh( run_rate );
% labeling
zlabel('Run Rate','FontWeight','Bold');
title('Run rate of Bangladesh in last 10 winning matches',...
      'FontWeight','Bold');
view(103,47);
box off ;
```
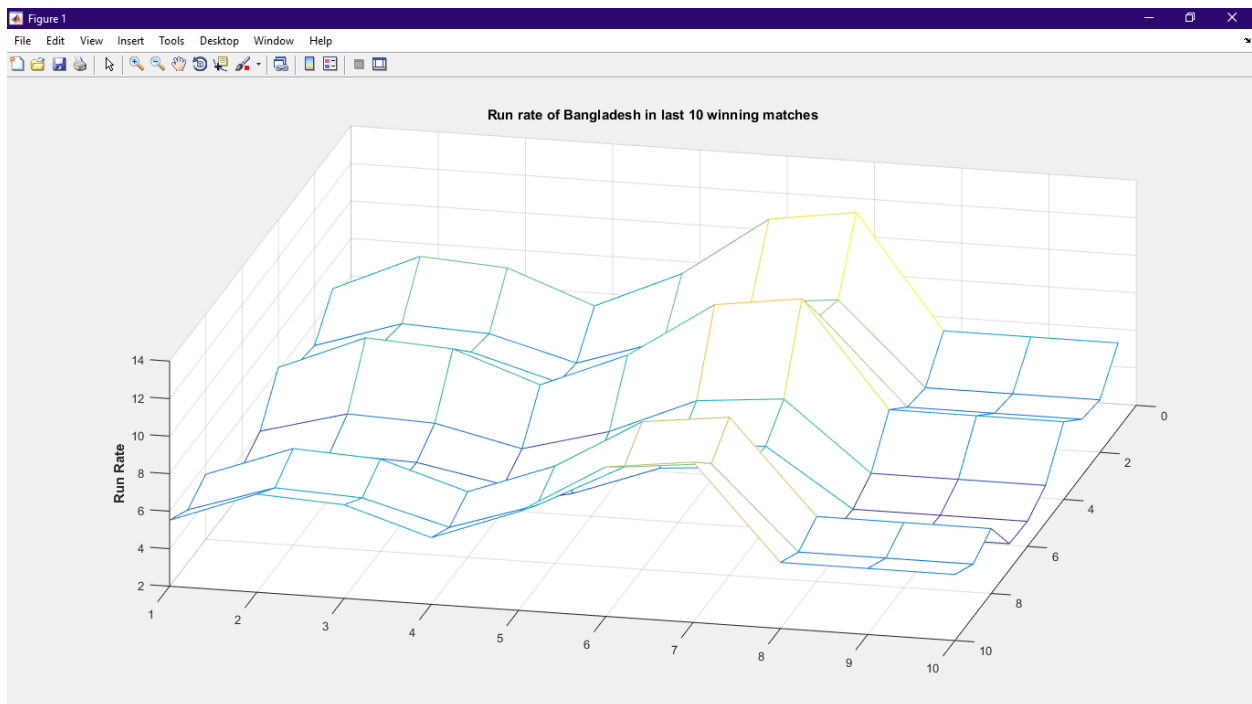
## Output:



Figure 15 : Output of Mesh Plot 2

# Mesh plot 3:

## Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza's Economy rate in last 10 winning match
mortaza_given_run = [ 48 52 44 53 17 29 13 47 40 ] ;
over = [ 10.0 8.0 10.0 10.0 7.0 5.0 5.0 6.0 9.0 9.0 ] ;
[run , over] = meshgrid( mortaza_given_run,over);
% finding economy rate
economy_rate = run ./ over;
% mesh plot
mesh(economy_rate,'facecolor','interp');
colormap spring ;
%labeling
zlabel('Economy rate','FontWeight','Bold');
title('Economy Rate of Mashrafe Mortaza in last 10 winning matches',…
    'FontWeight','Bold');
view(38,40) ;
```
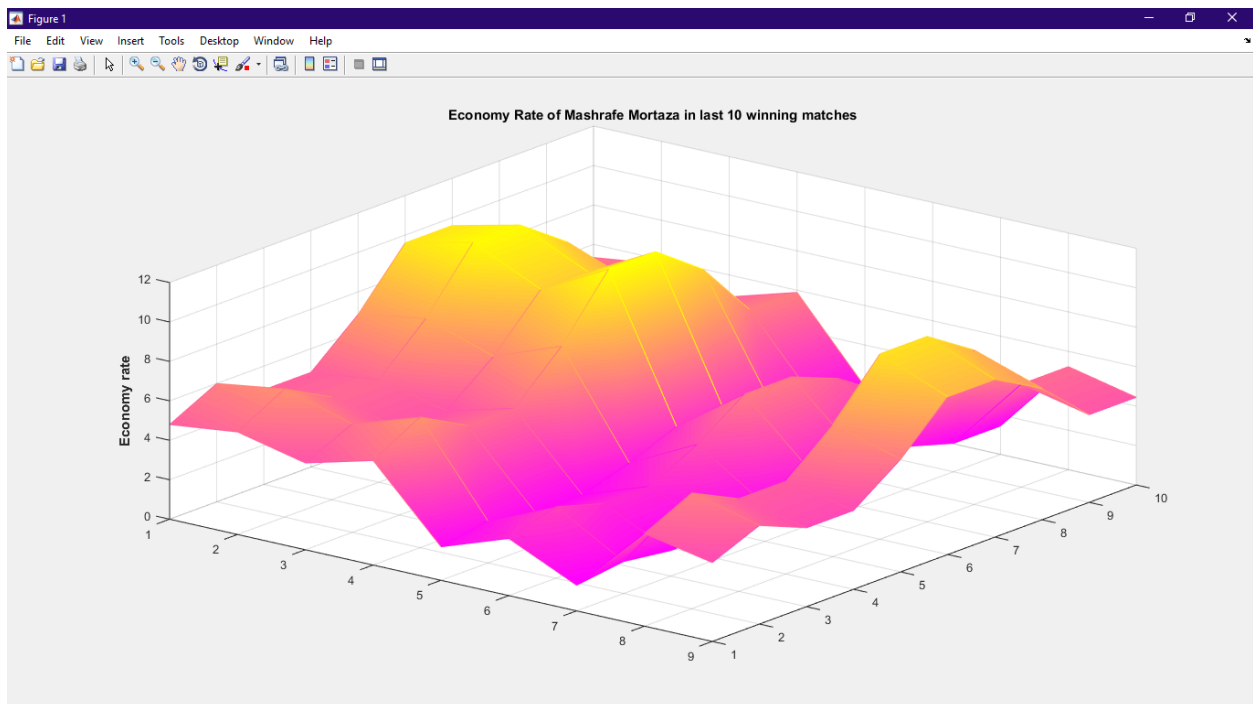
## Output:



Figure 16 : Output of Mesh plot 3

# Mesh plot 4:

Code:

```matlab
clear all ,close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs India 1st ODI

bd_run = [5 3 6 7 6 18 10 11 10 3 2 12 4 8 3 12 1 5 1 2 4 2 10 2 2 2 8 ...
          3 6 7 8 6 3 6 15 2 11 4 2 13 5 7 7 3 6 9 4 8 5 8] ;
over = ones(1,50) ;
[ run , over ] = meshgrid ( bd_run , over );

run_count = 0 ;
over_count = 0 ;

for i = 1 : 50
    for j = 1 : 50
        run_count = run(i,j) + run_count ;
        over_count = over(i,j) + over_count ;
        run_rate(i,j) = run_count / over_count ;
    end
end

% displaying final data
final_run_rate = run_count / over_count ;
disp(final_run_rate) ;

% mesh plot
mesh(run_rate,'facecolor','interp') ;
colormap jet ;

% labeling
zlabel('Run rate');
title('Bangladesh run rate change throughout the match','FontWeight','Bold');
view (131.5,50) ;
text(22.6,18.3,-1.7,'Bangladesh won by 79 runs','fontweight','bold') ;
```
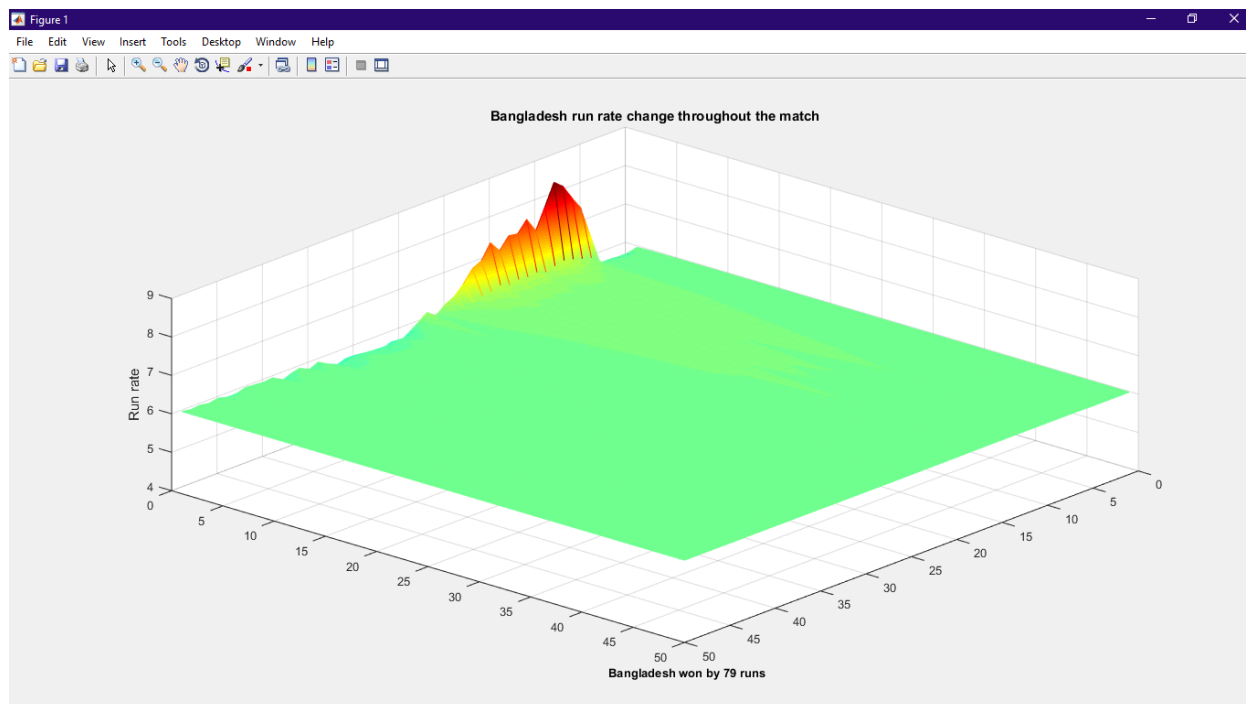
Output:



Figure 17 : Output of Mesh plot 4

# Mesh plot 5:

Code:

```
clear all ,close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza's Strike Rate in last 10 winning match

mortaza_ball = [60 48 60 60 30 30 36 54 54 ] ;% one match data is removed
wicket = [2 1 2 1 1 1 2 1 1 ] ;              % as that match was wicketless

[ball,wic] = meshgrid( mortaza_ball , wicket );
strike_rate = ball ./ wic;
% mesh plot
mesh( strike_rate, 'FaceColor','interp');
colormap summer ;
% labeling
zlabel('Strike rate','FontWeight','Bold');
title('Mashrafe Mortaza''s Strike Rate in last 10 winning match',…
     'FontWeight','Bold');
view(39.5,72);
```
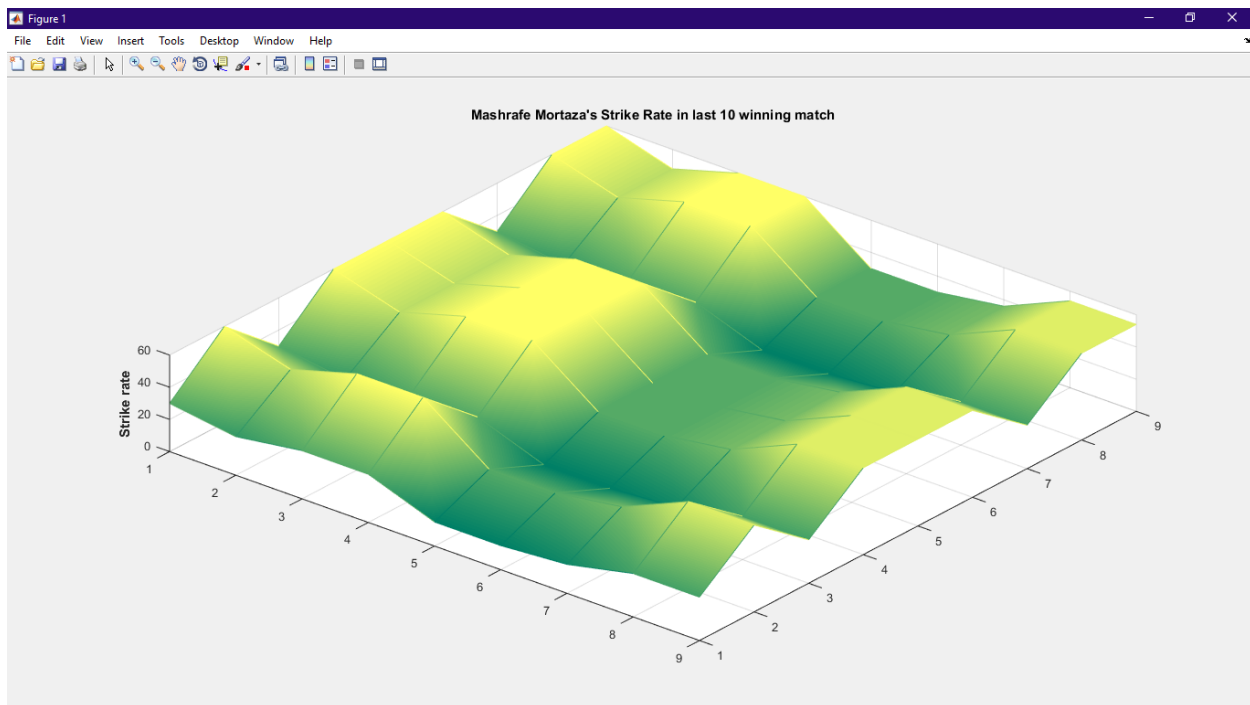
Output:



Figure 18 : Output of Mesh plot 5

# Surface plot 1:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs South Africa 2nd ODI 2015

mustafizur_run_given = [0 0 4 0 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 4 1 0 ...
   0 0 0 0 1 4 0 0 0 0 0 0 0 1 1 0 0 0 0 1 0 0 4 0 4 1 4 1 1 0 1 0 0 0 1 1 ]
;
wicket = [0 0 1 0 0 0 1 0 1 0 ] ;

[wic,run] = meshgrid ( wicket , mustafizur_run_given ) ;
% wic and run matrix size (row,col) = (60,10)
wic_count = 0 ;      % it will count total wicket from the beginning
run_count = 0 ;      % it will count total run from the beginning
bowling_average = zeros(60,10) ;

for i = 1: 60
    for j = 1: 10
        wic_count = wic_count + wic(i,j) ;
        run_count = run_count + run(i,j) ;
        if wic_count == 0
            % bowling average is not applicable ;
        else
            bowling_average(i,j) = (run_count/10) / (wic_count/60) ;
% as wic_count has 60 identical row and run_count has 10 identical column
        end
    end
end

final_bowling_average = (run_count/10) / (wic_count/60) ;
disp(final_bowling_average) ;

% surface plot will show the variation of the bowling average throughout
% the match and the final value of bowling_average will be as same as it
% really was

surf(bowling_average) ;
shading interp ;
title ('Bangladesh vs South Africa 2nd ODI 2015','FontWeight','Bold') ;
view(99.5,20) ;
zlabel('Mustafizur''s Bowling Average','FontWeight','Bold') ;
text(0,11.5,29,'Bangladesh won by 7 wickets (with 134 balls remaining)', ...
        'FontWeight','Bold','FontSize',11);
```
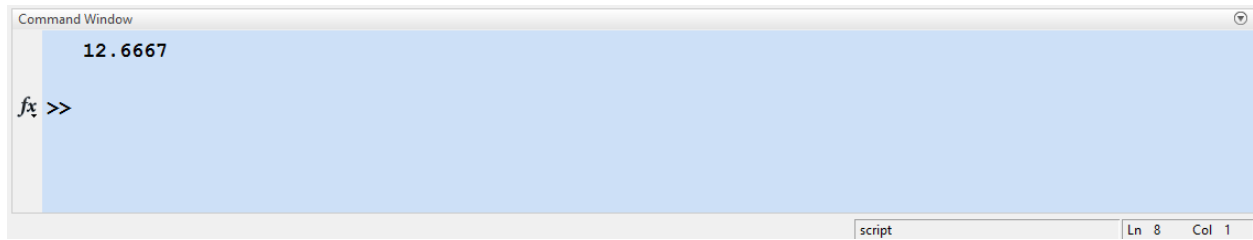
Command Window Output:



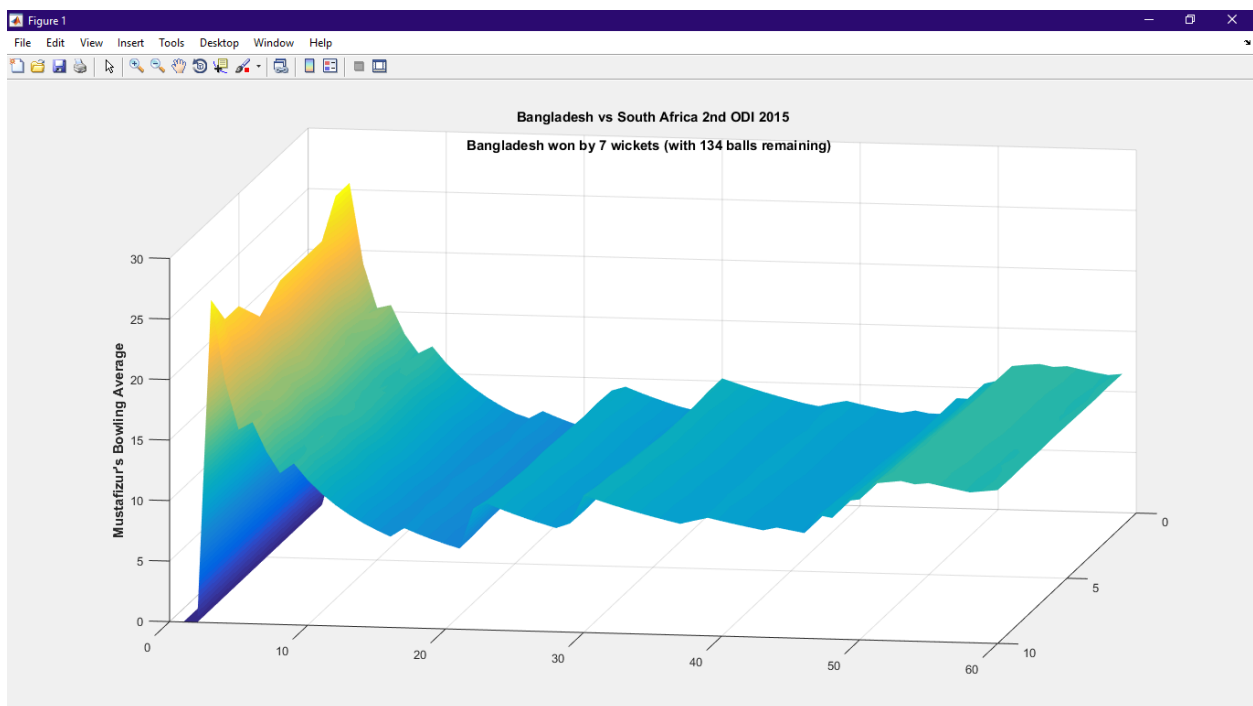Figure 19 : Command Window Output of Surface Plot 1

Output:



Figure 20 : Output of Surface Plot 1

# Surface plot 2:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Pakistan 3rd ODI 2015
shakib_run_given = [1 0 0 0 0 1 1 0 0 0 0 2 1 0 0 1 1 0 0 2 0 0 1 1 1 0 ...
    0 1 0 0 1 1 1 1 0 0 0 0 1 0 1 0 1 0 1 0 0 0 2 4 0 0 0 0 4 0 1 0 1 0 ] ;

ball =  [ 1 2 3 4 5 6 ] ;        % defining the number of the ball in a over

[ball,run] = meshgrid( ball, shakib_run_given) ;
% it will produce ball and run matrix of size ( row,col ) = ( 60,6 )

total_run =0;% it will count total_run of the run matrix from the beginning
over_count=0;%it will count total_over from the ball matrix

for i = 1: 60
    for j= 1 : 6
        total_run = total_run + run(i,j) ;
        over = over_count + ( ball(i,j) ) / 6 ;
        if ( ball(i,j) ) / 6 == 1
            over_count = over_count + 1 ;
        end
        economy_rate(i,j) = total_run / over ;
    end
end

% total ball is converted into over . as there is 60 row for 60 ball but
% at the same time each row has 6 columns. So, 1 row equal 1 over and
% finally total over will equal to 60. Total run will be 6 times more than
% real run as it counts the run that has equal 6 column but ratio will be
% same as it really is. Shakib's original economy in that match was 3.40.
% total_run/over is also 3.40. Surf plot will show the variation of the
% economy throughout the match.

shakib_economy = total_run / over ;
disp(shakib_economy);

surf(economy_rate) ;
set(gca,'Color',[.93,.93,.93] );
shading interp ;
view(99.5,20) ;
title('Bangladesh vs Pakistan 3rd ODI 2015','FontWeight','Bold') ;
zlabel('Shakib''s Economy Rate','FontWeight','Bold') ;
text(0,10,5.6,'Bangladesh won by 8 wickets (with 63 balls remaining)', ...
    'FontWeight','Bold','FontSize',11);
```
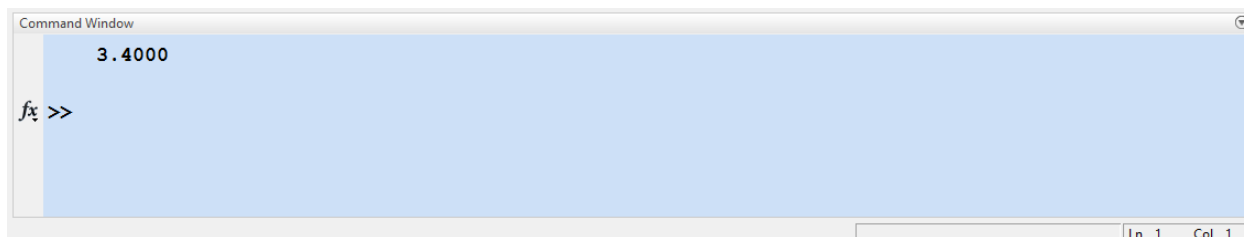
## Command Window Output:



Figure 21 : Command Window Output of Surface Plot 2
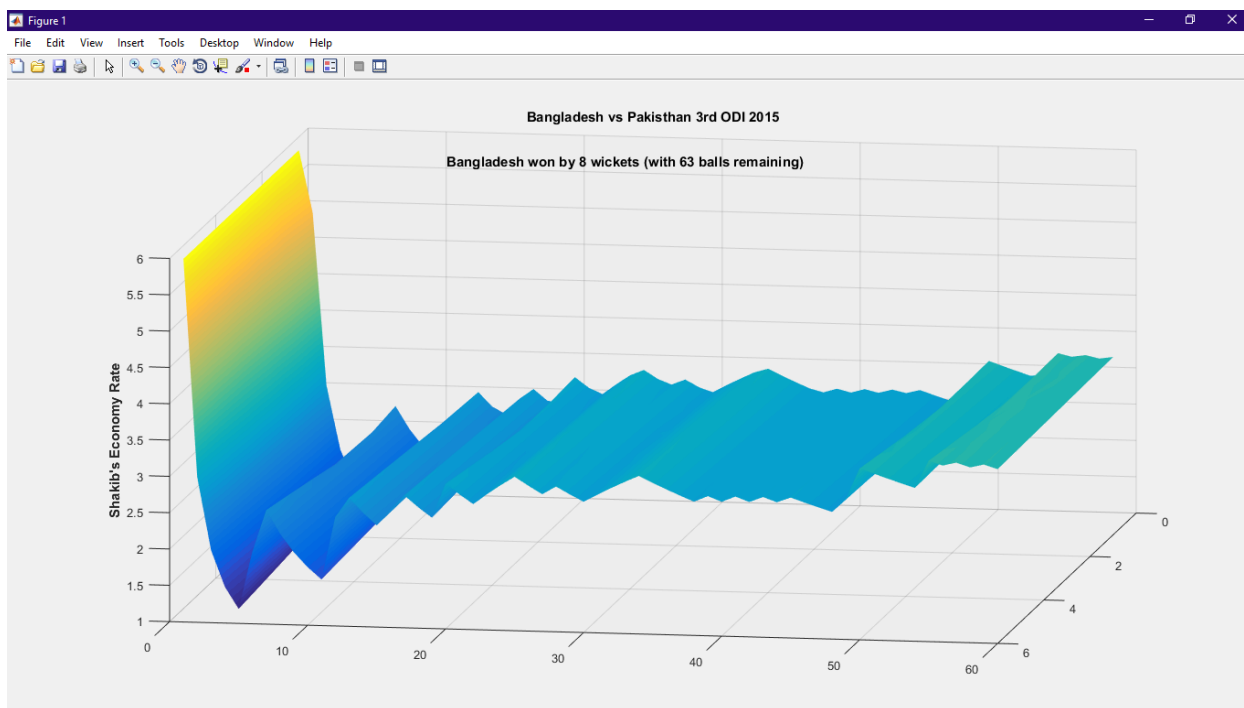
## Output:



Figure 22 : Output of Surface Plot 2

# Surface plot 3:

Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Zimbabwe 2nd ODI 2015
kayes_run = [ 0 0 0 0 2 0 0 0 4 1 1 0 0 4 0 0 1 1 0 0 0 0 0 6 0 0 1 0 4 ...
    0 1 0 0 0 0 0 4 1 0 0 6 1 0 0 1 1 1 1 0 6 1 0 1 1 0 1 0 0 4 0 0 1 0 ...
    1 0 0 1 0 0 0 0 1 0 1 0 1 0 1 4 0 1 0 1 0 1 0 0 6 0 ] ;
ball_faced = ones(1,89) ;
[ball,run] = meshgrid( ball_faced,kayes_run ) ;
% size of the ball and run matrix  : (row,col) = (89,89)
run_count = 0 ;
ball_count = 0 ;

for i = 1:89
    for j = 1 : 89
        run_count = run_count + run(i,j) ;     % run and ball matrix have
        ball_count = ball_count + ball(i,j) ; % same size
        strike_rate(i,j) = 100* ( (run_count) / ball_count) ;
    end
end
kayes_final_strike_rate = 100 * (run_count / ball_count) ;
disp( kayes_final_strike_rate ) ;
% surface plot will show the variation of strike rate throughout the
% innings. final strike rate equals to the actual strike rate
% surf plot
surf(strike_rate) ;
shading flat ;
view (102.5 , 12) ;
set(gca,'Color',[.93,.93,.93] );
title('Imrul Kayes Strike Rate vs Zimbabwe 2nd ODI2015', ...
      'FontWeight','Bold');
zlabel('Strike Rate','FontWeight','Bold') ;
text(0,20,0,'Bangladesh won by 58 runs','FontWeight','Bold','FontSize',11);
```
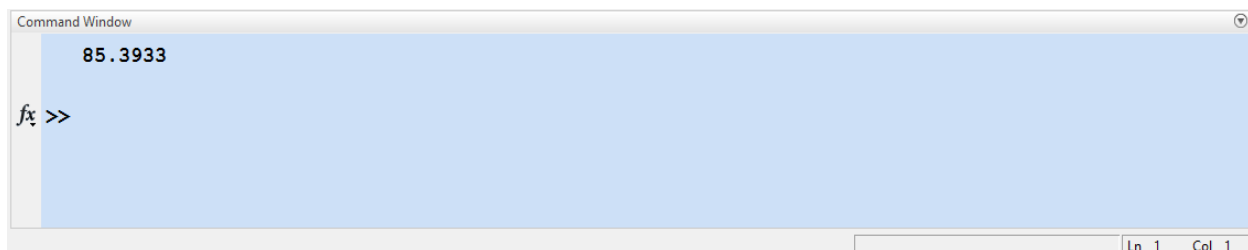
Command Window Output:

```
Command Window                                                        ⊙
    85.3933

fx >>                                                          Ln 1   Col 1
```

Figure 23 : Command Window Output of Surface Plot 3
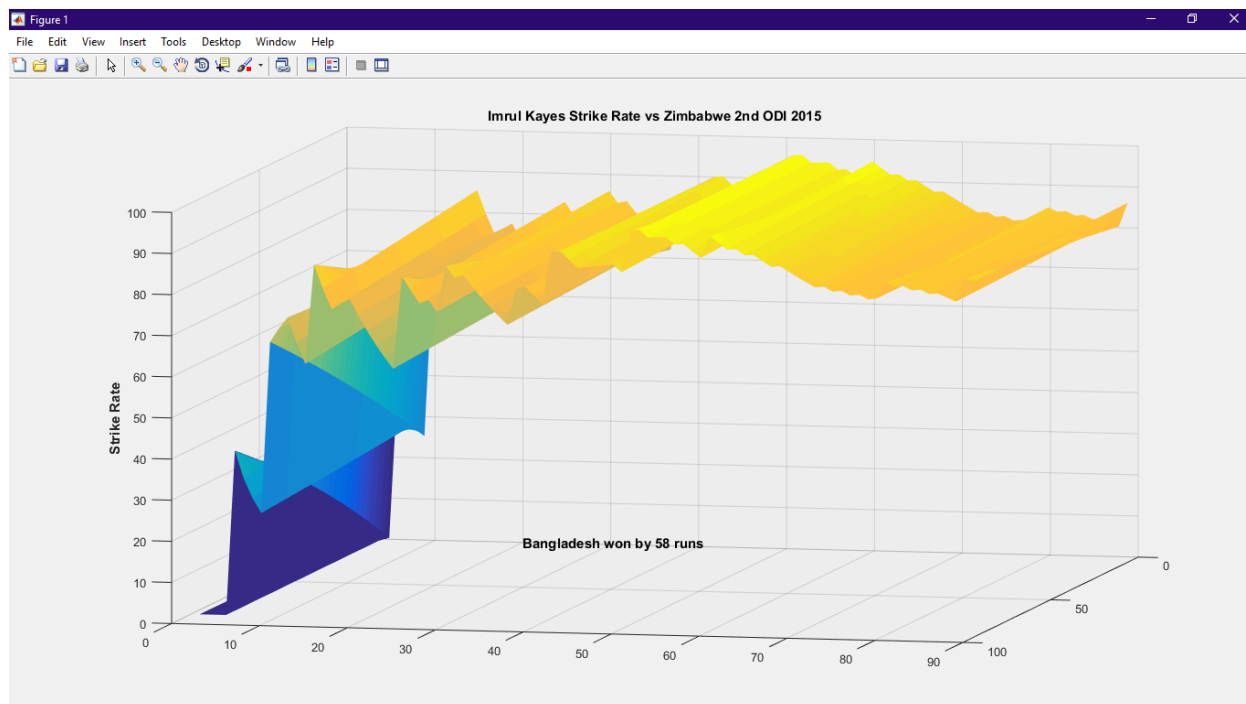
Output:



Figure 24 : Output of Surface Plot 3

# Surface plot 4:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Zimbabwe 1st ODI 2015
bd_run=[ 1 1 2 11 4 6 1 4 1 8 2 5 1 5 1 6 3 10 4 8 1 9 5 3 3 7 7 4 3 5 5 ...
         4 1 15 4 3 7 5 6 13 6 6 5 5 14 5 7 3 9 19 ] ;

bd_over = ones(1,50) ;
[over,run] = meshgrid(bd_over,bd_run) ;
% size of the over and run matrix is : (row,col) = (50,50)

run_count = 0 ;
over_count = 0 ;

for i = 1 : 50
    for j = 1 : 50
        run_count = run_count + run (i,j) ;
        over_count = over_count + over(i,j) ;
        run_rate(i,j) = run_count / over_count ;
    end
end
final_run_rate = run_count / over_count ;
disp(final_run_rate) ;

[cx,cy] = gradient (run_rate) ; % it determines whether the slope of the
% run rate changes with respect to Run(cx) and Over(cy)

subplot(2,1,1) ;
surf(run_rate,cx) ;   % color of the surface changes when runrate changes
                      % with respect to run
shading interp;
view(41,14) ;
box off ;
% labeling
ylabel('Over','FontWeight','Bold');
zlabel('Run Rate change with Run','FontWeight','Bold') ;
title ('Bangladesh vs Zimbabwe 1st ODI 2015','FontWeight','Bold') ;

hold on ;

subplot(2,1,2) ;
surf(run_rate,cy) ;   % color of the surface changes when runrate changes
                      % with respect to Over
% labeling
ylabel('Over','FontWeight','Bold');
```

```
zlabel('Run Rate change with Over','FontWeight','Bold') ;
shading interp ;
box off ;
view(41,14) ;
text(-15,62,-2.4,'Bangladesh won by 145 runs', ...
                'FontWeight','Bold','FontSize',11);
```
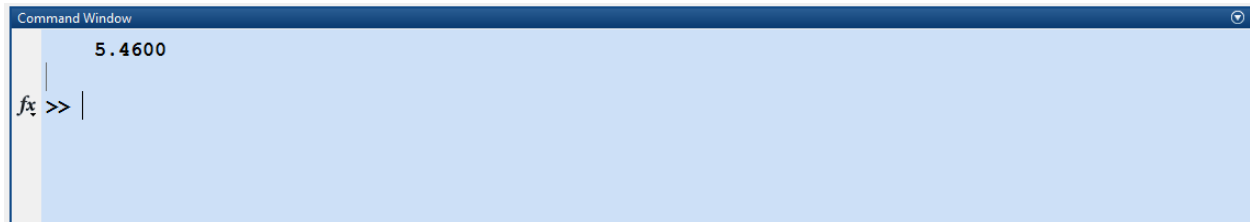
## Command Window Output:



Figure 25 : Command Window Output of Surface Plot 4
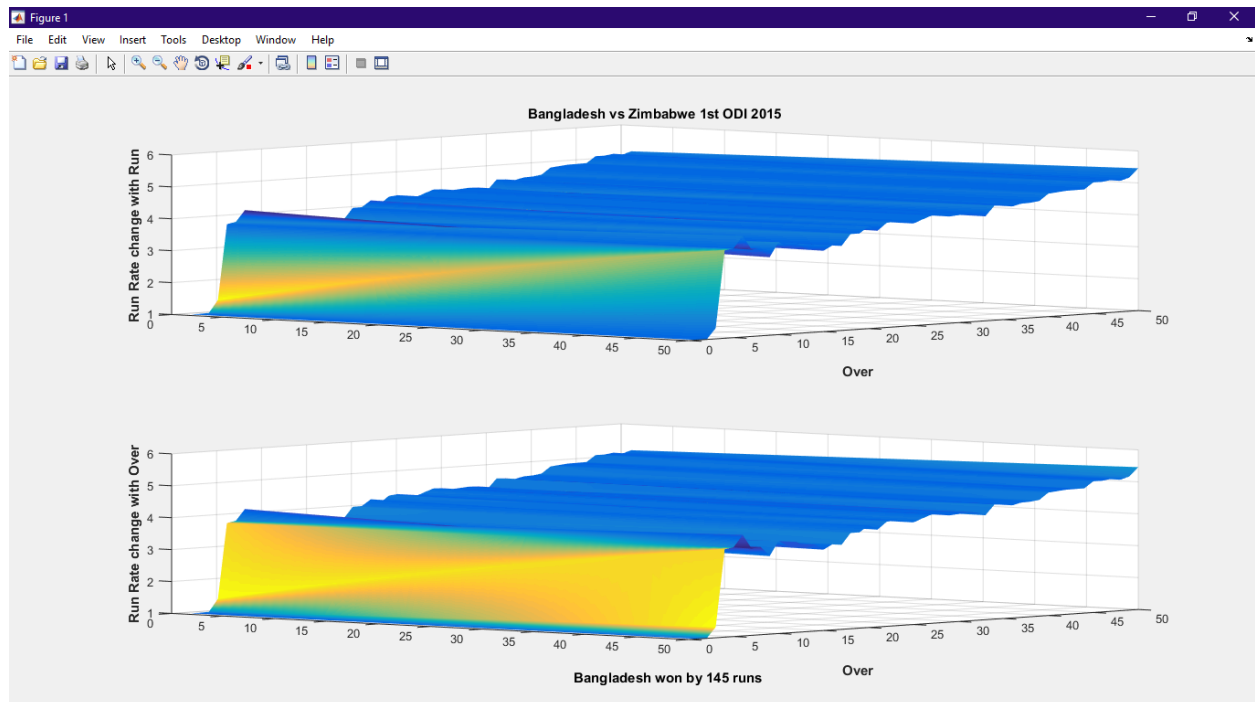
## Output:



Figure 26 : Output of Surface Plot 4

# Surface plot 5:

Code:

```
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs India 2nd ODI 2015
mustafizur_ball = [ 0 1 0 0 0 0
                    0 0 0 0 0 0             % 1 indicates wicket
                    0 0 0 0 0 0             % each row indicates a over
                    0 0 0 0 0 0
                    0 0 0 0 0 0
                    0 0 1 0 0 0
                    0 0 0 0 0 0
                    0 0 1 1 0 0
                    0 0 0 0 0 1
                    0 0 0 0 0 1 ]  ;
ball_count = 0 ;
wic_count = 0 ;

for i = 1:10
    for j = 1:6
        ball_count = ball_count + 1 ;
        if mustafizur_ball(i,j) == 1   % that mean a wicket
            wic_count = wic_count + 1 ;
        end
        if wic_count ~= 0  % without wicket strike rate is not valid
            strike_rate(i,j) = ball_count / wic_count ;
        end
    end
end

mustafizur_final_strike_rate = ball_count / wic_count ;
disp( mustafizur_final_strike_rate ) ;

% surf plot will show the variation of the strike rate throughout the match
surf(strike_rate) ;
box off ;
shading interp;
title('Mustafizur''s Strike Rate vs India 2nd ODI 2015') ;
hidden off ;

view(105,46) ;
zlabel('Strike Rate','FontWeight','Bold') ;
set(gca,'Color',[.93 .93 .93]) ;
```
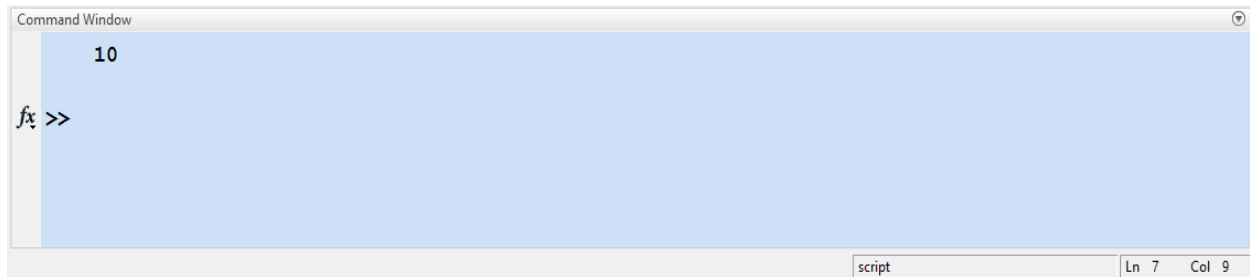
## Command Window Output:
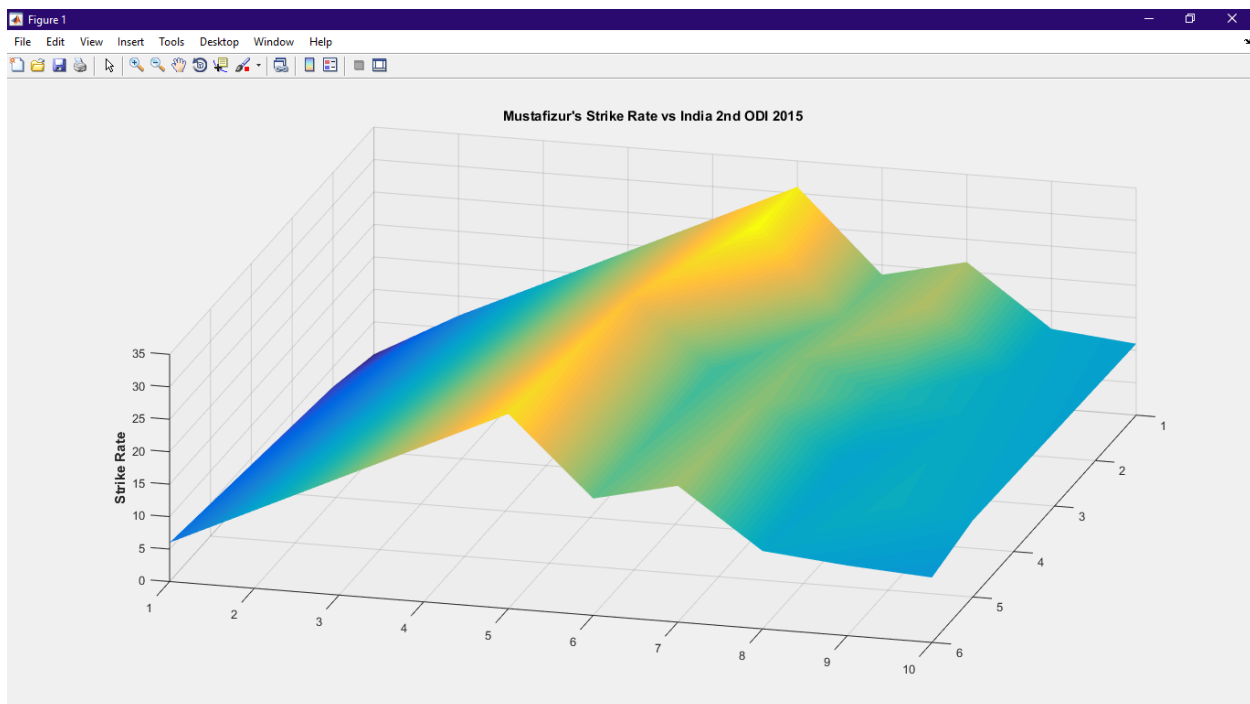


Figure 27 : Command Window Output of Surface Plot 5

## Output:



Figure 28 : Output of Surface Plot 5

# Contour plot 1:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs Pakistan 2nd ODI 2015

shakib_all_ball = [ 0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 1 2 1 1 0 0 0 0 0
                    0 0 2 1 3 1 1 1 0 0       % numbers indicate balls in that
                    0 1 2 4 4 3 0 0 0 0       % particular length
                    0 2 3 3 5 3 1 2 0 0
                    0 0 0 0 3 0 1 3 3 0
                    0 0 0 0 1 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 1 1 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0 ] ;
% contuor plot
contourf (shakib_all_ball,'edgecolor','none') ;
% limiting x axis
xlim([-4 16]);

colormap summer ;
box off ;
view(90,90) ;
axis off ;
title ('Bangladesh vs Pakistan 2nd ODI 2015',...
        'FontWeight','Bold') ;

text (-3,9,'Shakib''s ball pitched in different length','FontWeight','Bold');
l = legend('Most Ball Pitched') ;
set(l,'position', [.8 .8 .12 .12]) ;
set(l,'fontweight','bold') ;
```

```
% adding information

text(7,-.4,0, 'Batsman','rotation',90,'FontWeight','Bold') ;
text(7,23,0, 'Shakib','rotation',90,'FontWeight','Bold') ;
text(0,10,0,'Length','FontWeight','Bold') ;
text(12,2,0,'Yorker','FontWeight','Bold') ;
text(12,5,0,'Full','FontWeight','Bold') ;
text(12,7,0,'Good','FontWeight','Bold') ;
text(12,9,0,'Short','FontWeight','Bold') ;
text(12,12,0,'Very Short','FontWeight','Bold') ;
```
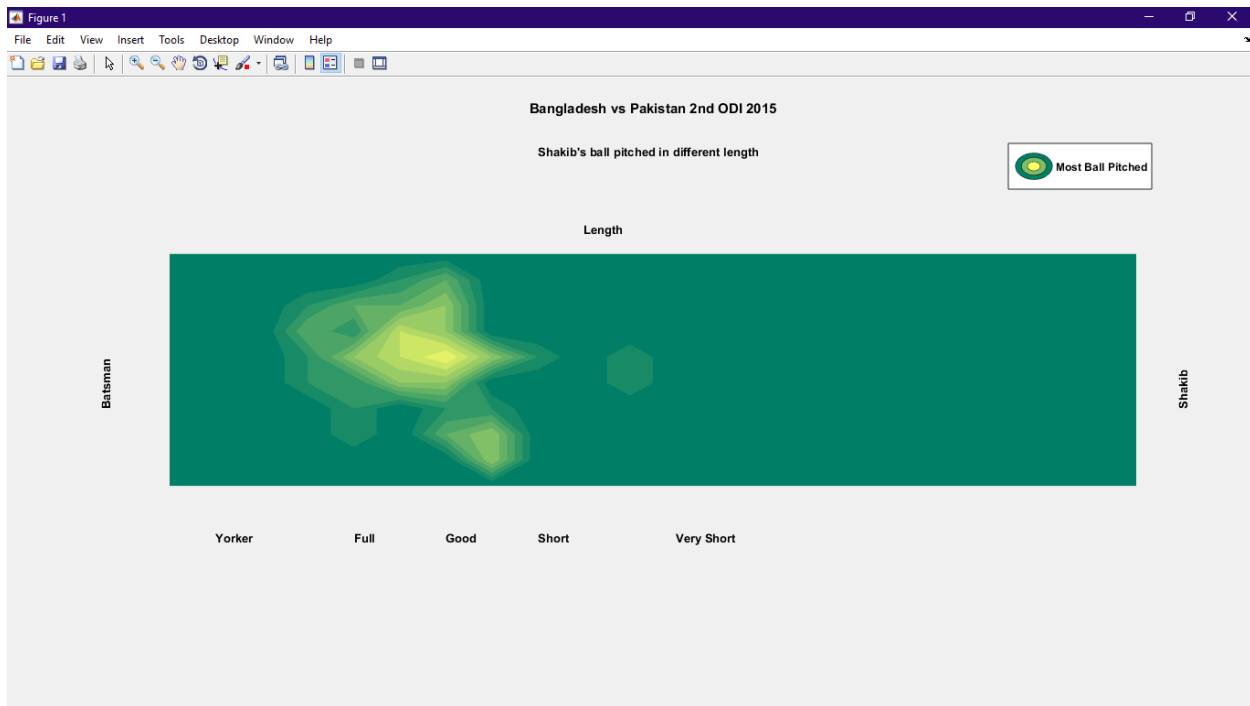
Output:



Figure 29 : Output of Contour Plot 1

# Contour plot 2:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Bangladesh vs India 2nd ODI 2015
mustafizur_all_ball = [ 0 0 0 0 0 0 1 2 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 1 1 0 0 0 0 0 0 0
                        0 0 2 2 3 0 0 0 0 0 0
                        0 0 1 0 1 0 0 0 0 0 0
                        0 0 2 3 2 1 0 0 0 0 0
                        0 0 3 5 3 1 2 2 0 0 0
                        0 0 1 4 1 3 5 1 0 0 0
                        0 0 2 0 0 4 0 1 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 3 1 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 1 0 0 0 0 0
                        0 0 0 0 0 1 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 0
                        0 0 0 0 0 0 0 0 0 0 ] ;
% contour plot
contourf(mustafizur_all_ball,'edgecolor','none') ;
% limiting x axis
xlim([-4 16]);

colormap jet ;
box off ;
view(90,90) ;
axis off ;
title ('Bangladesh vs india 2nd ODI 2015',...
       'FontWeight','Bold') ;

text (-3,9,'Mustafizur''s ball pitched in different
length','FontWeight','Bold') ;
l = legend('Most Ball Pitched') ;
set(l,'position', [.8 .8 .12 .12]) ;
set(l,'fontweight','bold') ;
```

```
% adding information

text(7,-.4,0, 'Batsman','rotation',90,'FontWeight','Bold') ;
text(7,23,0, 'Mustafizur','rotation',90,'FontWeight','Bold') ;
text(0,12,0,'Length','FontWeight','Bold') ;
text(12,2,0,'Yorker','FontWeight','Bold') ;
text(12,5,0,'Full','FontWeight','Bold') ;
text(12,7,0,'Good','FontWeight','Bold') ;
text(12,9,0,'Short','FontWeight','Bold') ;
text(12,12,0,'Very Short','FontWeight','Bold') ;
```
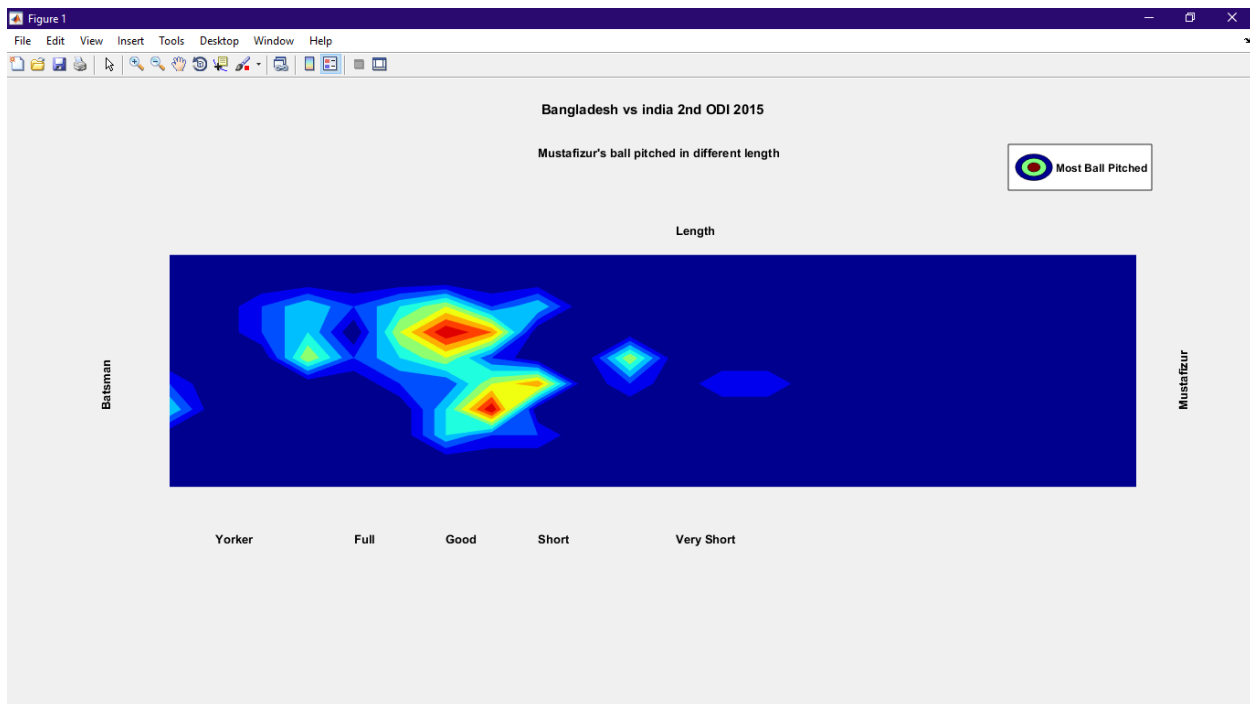
Output:



Figure 30 : Output of Contour Plot 2

# Contour plot 3:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Shakib al hasan all wickets in different length in last 10 winning
% matches
shakib_wickets = [  0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0    % yorker length
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 1 0 0    % full length
                    0 0 0 0 1 1 0 0 0 0    % numbers indicate wickets in that
                    0 0 1 2 0 0 0 0 0 0    % particuler length
                    0 0 0 1 2 2 1 1 0 0    % good length
                    0 0 0 0 0 1 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 1 0 0 0 0 0 0    % short length
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0    % very short length
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0
                    0 0 0 0 0 0 0 0 0 0  ] ;
% contour plot
contourf( shakib_wickets,'edgecolor','none') ;
colormap summer ;
l = legend('Most Wickets') ;
set(l,'position', [.8 .8 .12 .12]) ;
set(l,'fontweight','bold') ;

view (90,90) ;
% limiting x axis
xlim([-4 16]) ;

axis off ;
box off ;
title('Shakib Al Hasan all wickets in different length in last 10 winning
match',...
      'FontWeight','Bold') ;
```

```
% adding information

text(7,-.4,0, 'Batsman','rotation',90,'FontWeight','Bold') ;
text(7,23,0, 'Shakib','rotation',90,'FontWeight','Bold') ;
text(0,10,0,'Length','FontWeight','Bold') ;
text(12,2,0,'Yorker','FontWeight','Bold') ;
text(12,5,0,'Full','FontWeight','Bold') ;
text(12,7,0,'Good','FontWeight','Bold') ;
text(12,9,0,'Short','FontWeight','Bold') ;
text(12,12,0,'Very Short','FontWeight','Bold') ;
```
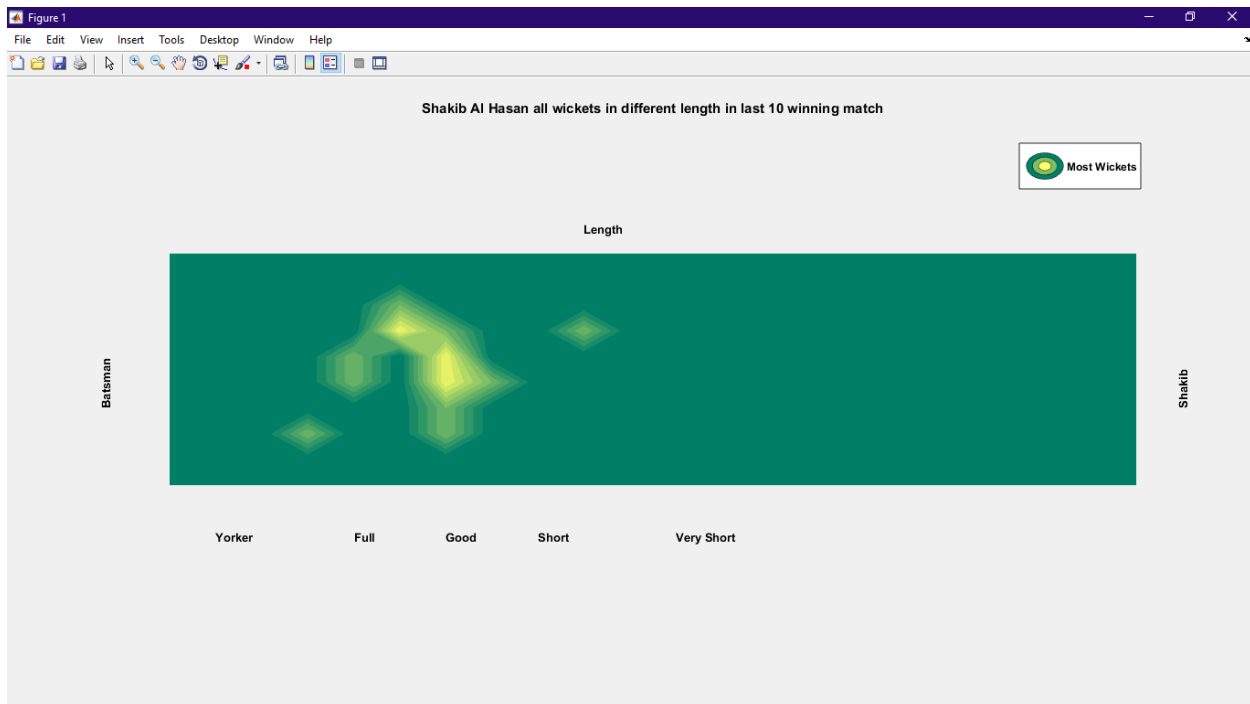
Output:



Figure 31 : Output of Contour Plot 3

# Contour plot 4:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza Conceded 40 Runs in different length balls

mortaza_run = [ 0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 1 2 2 0 0 0 0 0
                0 0 0 1 2 3 2 1 0 0 0
                0 0 3 3 5 1 1 0 0 0 0
                0 0 2 2 2 1 0 0 0 0 0
                0 0 0 1 1 2 1 0 0 0 0
                0 0 0 1 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0 ] ;

% contour plot
contourf( mortaza_run,'edgecolor','none') ;
colormap hsv;

l = legend('Most Runs') ;
set(l,'position', [.8 .8 .12 .12]) ;
set(l,'fontweight','bold') ;

view (90,90) ;
% limiting x axis
xlim([-4 16]) ;

axis off ;
box off ;
title('Mashrafe Mortaza Conceded 40 Runs in different length balls',...
    'FontWeight','Bold') ;
```

```
% adding information

text(7,-.4,0, 'Batsman','rotation',90,'FontWeight','Bold') ;
text(7,23,0, 'Mashrafe','rotation',90,'FontWeight','Bold') ;
text(0,10,0,'Length','FontWeight','Bold') ;
text(12,2,0,'Yorker','FontWeight','Bold') ;
text(12,5,0,'Full','FontWeight','Bold') ;
text(12,7,0,'Good','FontWeight','Bold') ;
text(12,9,0,'Short','FontWeight','Bold') ;
text(12,12,0,'Very Short','FontWeight','Bold') ;
text(15.07,9.06,'Bangladesh vs Zimbabwe 3rd ODI 2015','FontWeight','Bold') ;
text(16.32,9.46,'Bangladesh won by 61 runs','FontWeight','Bold') ;
```
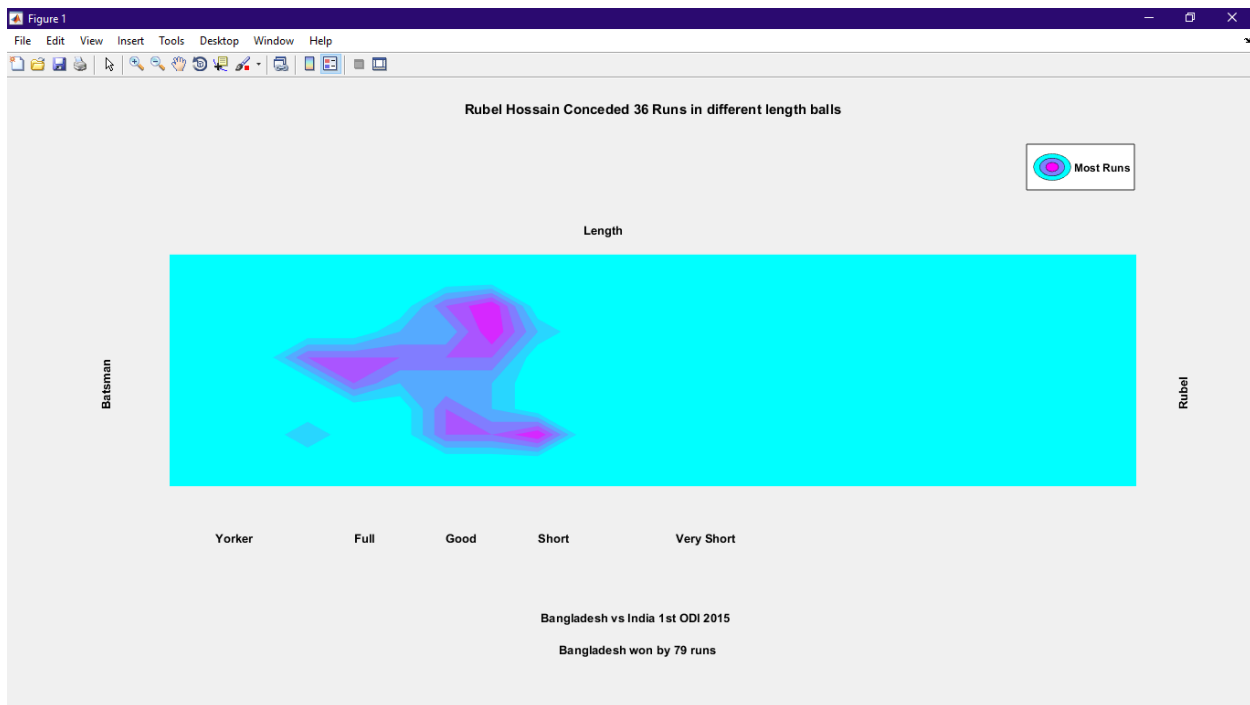
Output:



Figure 32 : Output of Contour Plot 4

# Contour plot 5:

Code:

```matlab
clear all , close all ;
clc , clf ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Mashrafe Mortaza Conceded 40 Runs in different length balls

mortaza_run = [ 0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 1 2 2 0 0 0 0 0
                0 0 0 1 2 3 2 1 0 0 0
                0 0 3 3 5 1 1 0 0 0 0
                0 0 2 2 2 1 0 0 0 0 0
                0 0 0 1 1 2 1 0 0 0 0
                0 0 0 1 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0
                0 0 0 0 0 0 0 0 0 0 0 ] ;

% contour plot
contourf( mortaza_run,'edgecolor','none') ;
colormap hsv;

l = legend('Most Runs') ;
set(l,'position', [.8 .8 .12 .12]) ;
set(l,'fontweight','bold') ;

view (90,90) ;
% limiting x axis
xlim([-4 16]) ;

axis off ;
box off ;
title('Mashrafe Mortaza Conceded 40 Runs in different length balls',...
    'FontWeight','Bold') ;
```

```
% adding information

text(7,-.4,0, 'Batsman','rotation',90,'FontWeight','Bold') ;
text(7,23,0, 'Mashrafe','rotation',90,'FontWeight','Bold') ;
text(0,10,0,'Length','FontWeight','Bold') ;
text(12,2,0,'Yorker','FontWeight','Bold') ;
text(12,5,0,'Full','FontWeight','Bold') ;
text(12,7,0,'Good','FontWeight','Bold') ;
text(12,9,0,'Short','FontWeight','Bold') ;
text(12,12,0,'Very Short','FontWeight','Bold') ;
text(15.07,9.06,'Bangladesh vs Zimbabwe 3rd ODI 2015','FontWeight','Bold') ;
text(16.32,9.46,'Bangladesh won by 61 runs','FontWeight','Bold') ;
```
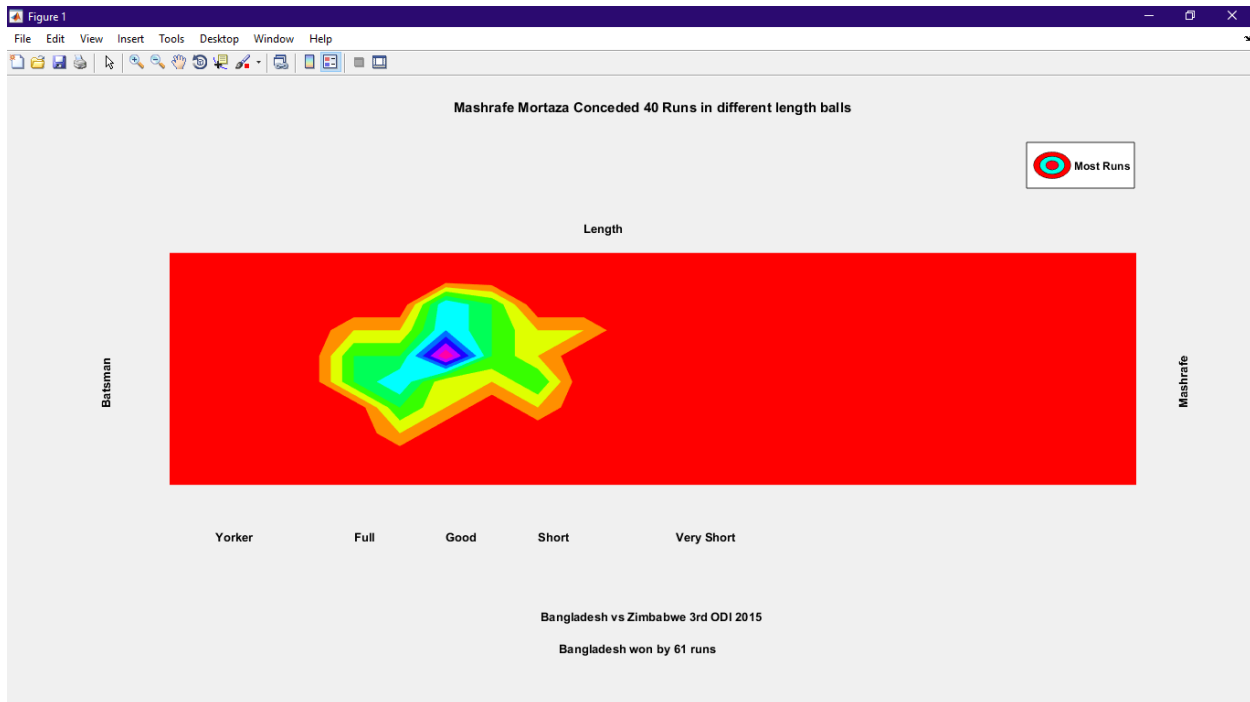
Output:



Figure 33 : Output of Contour Plot 5

# Duckworth Lewis Method

Code:

```
close all , close all;
clc ;
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Duckworth Lewis Method
% D\L Method resource table for standard edition

resource_table = [ ...      % each row = over and column = wicket lost
0        0        0        0        0        0        0        0        0        0
3.6      3.6      3.6      3.6      3.6      3.5      3.5      3.4      3.2      2.5
7.2      7.1      7.1      7.0      7.0      6.8      6.6      6.2      5.5      3.7
10.6     10.5     10.4     10.3     10.2     9.9      9.5      8.7      7.2      4.2
13.9     13.8     13.7     13.5     13.2     12.7     12       10.7     8.4      4.5
17.2     17       16.8     16.5     16.1     15.4     14.3     12.5     9.4      4.6
20.3     20.1     19.8     19.4     18.8     17.8     16.4     13.9     10.1     4.6
23.4     23.1     22.7     22.2     21.4     20.1     18.2     15.2     10.5     4.7
26.4     26       25.5     24.8     23.8     22.3     19.9     16.2     10.9     4.7
29.3     28.9     28.2     27.4     26.1     24.2     21.4     17.1     11.2     4.7
32.1     31.6     30.8     29.8     28.3     26.1     22.8     17.9     11.4     4.7
34.9     34.2     33.4     32.1     30.4     27.8     24.0     18.5     11.5     4.7
37.6     36.8     35.8     34.3     32.3     29.4     25.1     19.0     11.6     4.7
40.2     39.3     38.1     36.5     34.2     30.8     26.1     19.5     11.7     4.7
42.7     41.7     40.4     38.5     35.9     32.2     27.0     19.9     11.8     4.7
45.2     44.1     42.6     40.5     37.6     33.5     27.8     20.2     11.8     4.7
47.6     46.3     44.7     42.3     39.1     34.7     28.5     20.5     11.8     4.7
49.9     48.5     46.7     44.1     40.6     35.8     29.2     20.7     11.9     4.7
52.2     50.7     48.6     45.9     42.0     36.8     29.8     20.9     11.9     4.7
54.4     52.8     50.5     47.5     43.4     37.7     30.3     21.1     11.9     4.7
56.6     54.8     52.4     49.1     44.6     38.6     30.8     21.2     11.9     4.7
58.7     56.7     54.1     50.6     45.8     39.4     31.2     21.3     11.9     4.7
60.7     58.6     55.8     52.0     47.0     40.2     31.6     21.4     11.9     4.7
62.7     60.4     57.4     53.4     48.0     40.9     32.0     21.5     11.9     4.7
64.6     62.2     59.0     54.7     49.0     41.6     32.3     21.6     11.9     4.7
66.5     63.9     60.5     56.0     50.0     42.2     32.6     21.6     11.9     4.7
68.3     65.6     62.0     57.2     50.9     42.8     32.8     21.7     11.9     4.7
70.1     67.2     63.4     58.4     51.8     43.3     33.0     21.7     11.9     4.7
71.8     68.8     64.8     59.5     52.6     43.8     33.2     21.8     11.9     4.7
73.5     70.3     66.1     60.5     53.4     44.2     33.4     21.8     11.9     4.7
75.1     71.8     67.3     61.6     54.1     44.7     33.6     21.8     11.9     4.7
76.7     73.2     68.6     62.5     54.8     45.1     33.7     21.9     11.9     4.7
78.3     74.6     69.7     63.5     55.4     45.4     33.9     21.9     11.9     4.7
79.8     75.9     70.9     64.4     56.0     45.8     34.0     21.9     11.9     4.7
81.3     77.2     72.0     65.2     56.6     46.1     34.1     21.9     11.9     4.7
82.7     78.5     73.0     66.0     57.2     46.4     34.2     21.9     11.9     4.7
84.1     79.7     74.1     66.8     57.7     46.6     34.3     21.9     11.9     4.7
85.4     80.9     75.0     67.6     58.2     46.9     34.4     21.9     11.9     4.7
86.7     82.0     76.0     68.3     58.7     47.1     34.5     21.9     11.9     4.7
88.0     83.1     76.9     69.0     59.1     47.4     34.5     22.0     11.9     4.7
89.3     84.2     77.8     69.6     59.5     47.6     34.6     22.0     11.9     4.7
90.5     85.3     78.7     70.3     59.9     47.8     34.6     22.0     11.9     4.7
91.7     86.3     79.5     70.9     60.3     47.9     34.7     22.0     11.9     4.7
92.8     87.3     80.3     71.4     60.7     48.1     34.7     22.0     11.9     4.7
93.9     88.2     81.0     72.0     61.0     48.3     34.8     22.0     11.9     4.7
```

```
 95.0    89.1    81.8    72.5    61.3    48.4    34.8    22.0    11.9    4.7
 96.1    90.0    82.5    73.0    61.6    48.5    34.8    22.0    11.9    4.7
 97.1    90.9    83.2    73.5    61.9    48.6    34.9    22.0    11.9    4.7
 98.1    91.7    83.8    74.0    62.2    48.8    34.9    22.0    11.9    4.7
 99.1    92.6    84.5    74.4    62.5    48.9    34.9    22.0    11.9    4.7
100.0    93.4    85.1    74.9    62.7    49.0    34.9    22.0    11.9    4.7 ]
;

% team 1 information
team_1_run = input('Enter the total run of team 1 : ') ;
team_1_resource = 100 ;
total_over = 50 ;

%team 2 information
team_2_over = 20 ;                      % Team 2 has already played 20 over
over_left = total_over - team_2_over ;
next_5_over = team_2_over ;
wicket_lost = input('Enter the number of wicket(s) team 2 lost : ') ;
fprintf('\n');

% new target calculation
new_set_over = over_left ;
x = over_left - 5 ;

new_target = [];
iteration = 0 ;

while ( new_set_over > 0)
resource_when_match_stop = resource_table( over_left+1 , wicket_lost+1 ) ;
new_set_over = new_set_over - 5 ;% 5 overs will be suspended in every
iteration

resource_at_new_set_over = resource_table( new_set_over+1,wicket_lost+1 ) ;
resource_lost = resource_when_match_stop - resource_at_new_set_over ;
team_2_resource  = 100 - resource_lost ;

target = round ( team_1_run * ( team_2_resource / team_1_resource ) ) + 1 ;
next_5_over = next_5_over + 5 ;
fprintf('After %d over target : %d Run(s) \n',next_5_over,target) ;
new_target = [new_target target] ;
iteration = iteration + 1 ;
end

over = linspace( x , 50, iteration ) ;
plot( over ,new_target ,'-O','LineWidth',2,'MarkerSize',6,...
      'MarkerEdgeColor','r','MarkerFaceColor','w');
xlabel('Overs','FontWeight','Bold');
ylabel('Target','FontWeight','Bold') ;
title ('Duckworth Lewis Method','FontWeight','Bold') ;
text(28.5,293.2,'Team 2 has already played 20 overs and plot shows what will
be the new target after every next 5 overs',...
    'FontWeight','Bold','FontSize',12);
```

Command Window Output:

Team 2 has already played 20 overs and then interruption has occurred.



Figure 34 : Command Window Output of D\L Method

Output:
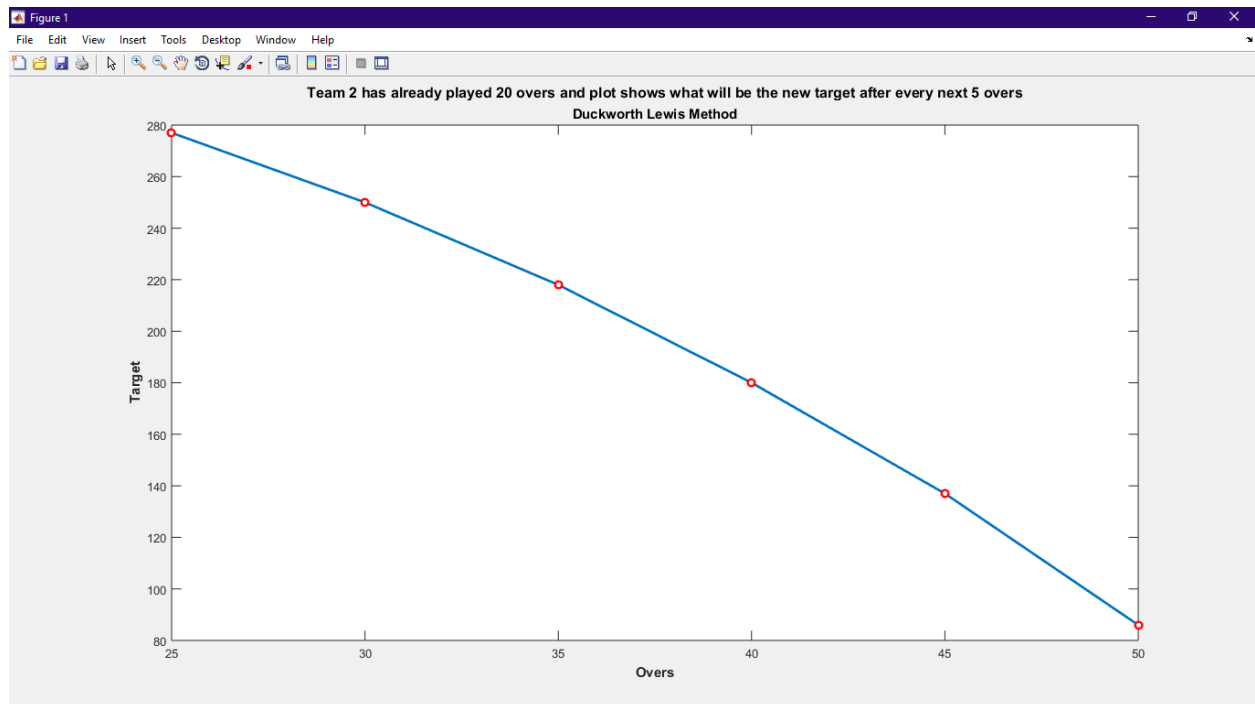


Figure 35 : Graphical Output of D\L Method

# Reference:

All the data are taken from ESPN cricinfo. (http://www.espncricinfo.com/).

Accessed between September 9, 2016 to September 14, 2016