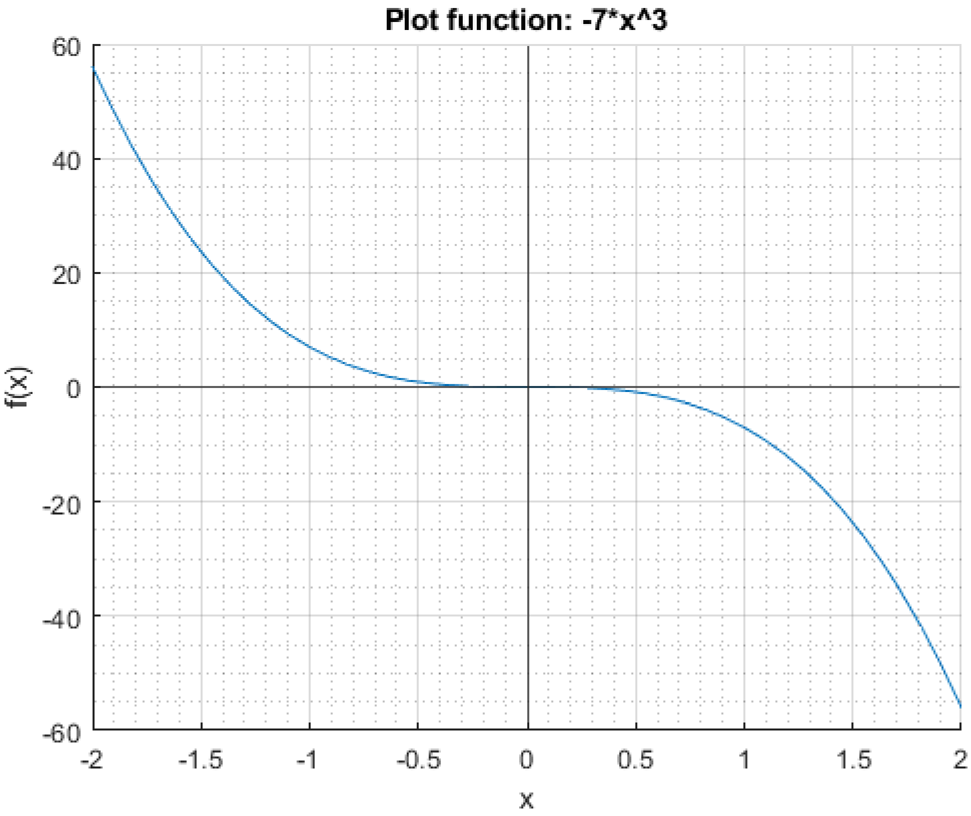
Matlab Graph One Variable Function

back to Fan's Intro Math for Econon, Matlab Examples, or MEconTools Repositories

fplot a Function of X

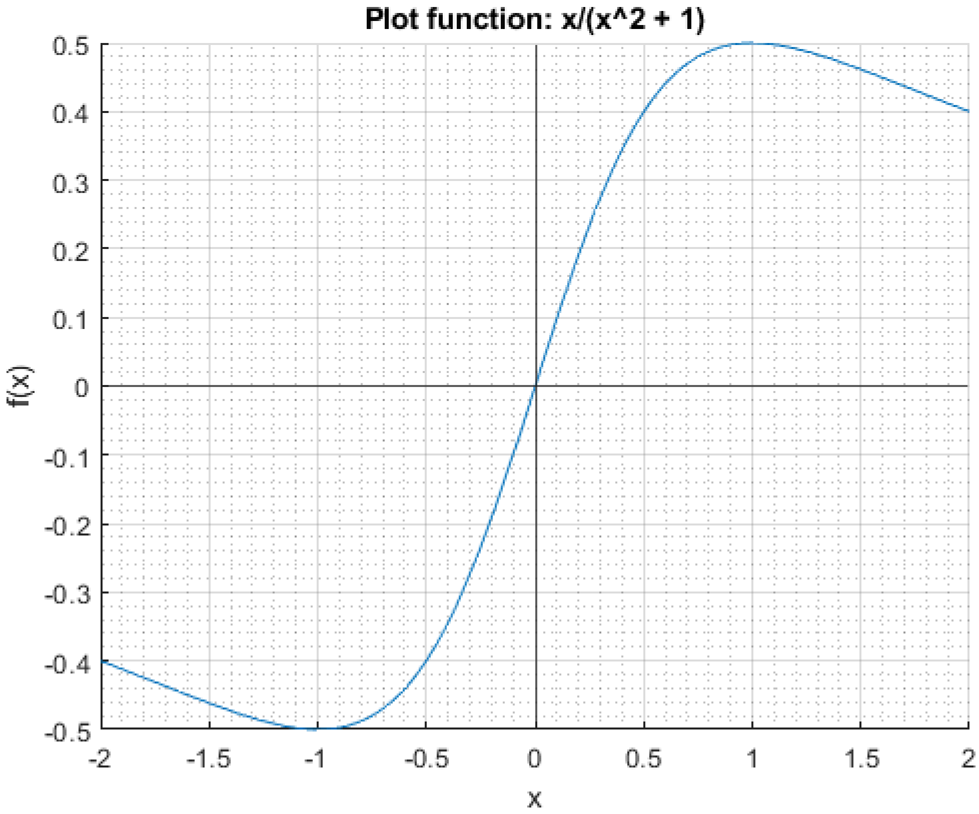
Given a cubic (polynomial) function, graph it using the fplot function, between some values along the domain of the function. This function is defined everywhere along the real-line. Note that fplot automatically resizes the y-scale to show the full plot clearly.

```
% close all
figure();
hold on;

% Define a function
syms x
f_x = -7*x^(3);

% Set bounds on the domain
fl_x_lower = -2;
fl_x_higher = 2;

% Graph
fplot(f_x, [fl_x_lower, fl_x_higher])

% Add x-axis and y-axis
xline(0);
yline(0);

% Title and y and y-able
title(['Plot function: ' char(f_x)],'Interpreter',"none");
ylabel('f(x)');
xlabel('x');

% Add grids
grid on;
grid minor;
```



Plot a rational function, that is a function of polynomials.

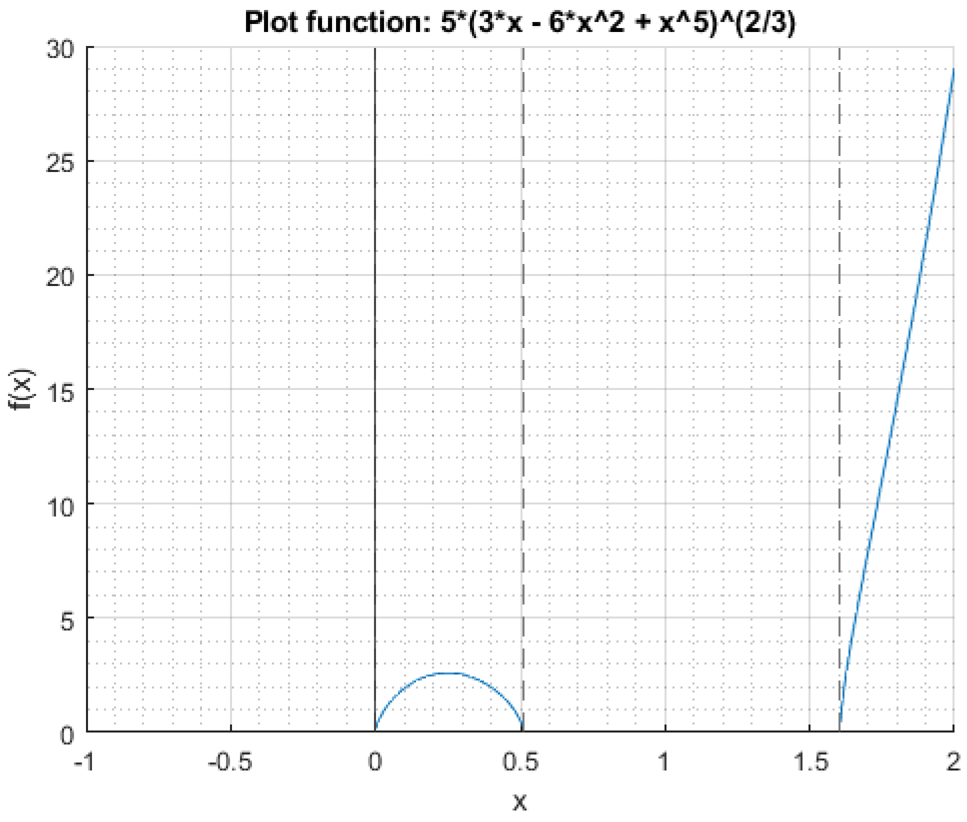
```
% close all
figure();
hold on;

% Define a function
syms x
f_x = (x)/(x^2 + 1);

% Set bounds on the domain
fl_x_lower = -2;
fl_x_higher = 2;

% Graph
fplot(f_x, [fl_x_lower, fl_x_higher])

% Add x-axis and y-axis
xline(0);
yline(0);

% Title and y and y-able
title(['Plot function: ' char(f_x)],'Interpreter',"none");
ylabel('f(x)');
xlabel('x');

% Add grids
grid on;
grid minor;
```



Plot a function that is not defined at all points along the real line. Note also that the function always returns a positive value. Note the fplot function automatically identifies the part of the x-axis where the function is not defined, and draws dashed lines to demarcate.

```
% close all
figure();
hold on;

% Define a function
syms x
f_x = 5*(x^5 - 6*x^2 + 3*x)^(2/3);

% Set bounds on the domain
fl_x_lower = -1;
fl_x_higher = 2;

% Graph
fplot(f_x, [fl_x_lower, fl_x_higher])

% Add x-axis and y-axis
xline(0);
yline(0);

% Title and y and y-able
title(['Plot function: ' char(f_x)],'Interpreter',"none");
ylabel('f(x)');
```

```
xlabel('x');

% Add grids
grid on;
grid minor;
```

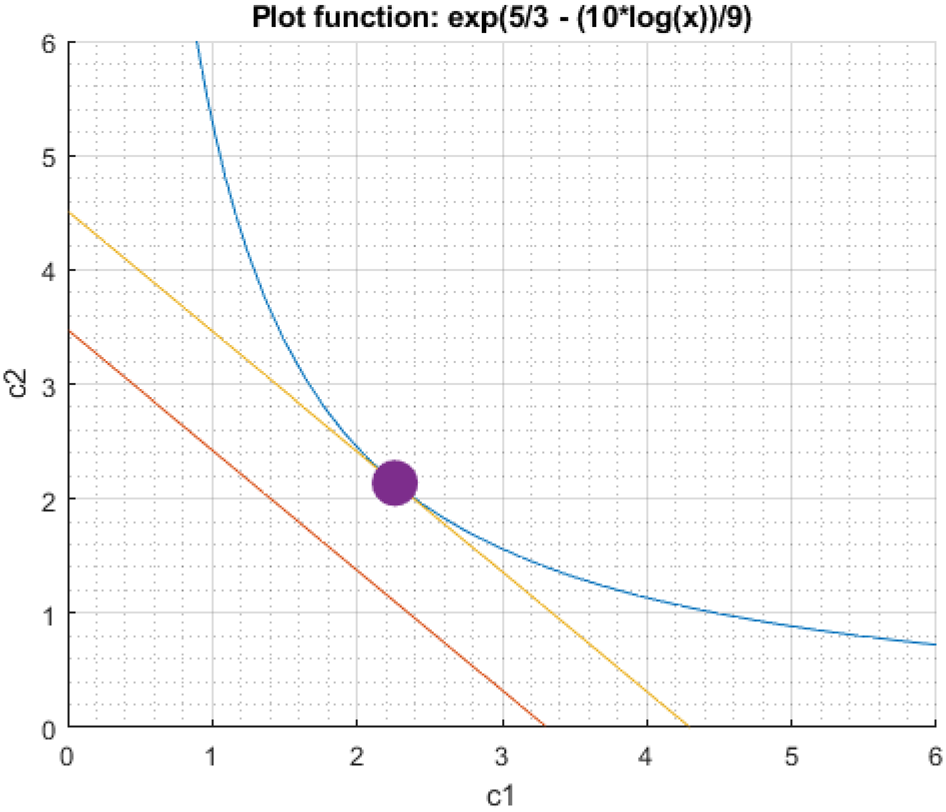


Plot Indifference Curve and Budget Constraint

Indifference curve and two budget lines. From two period consumption and savings problem.

```
% close all
figure();
hold on;

% Define parameters
e1 = 1.5;
e2 = 1.9;
r = 0.05;

u_star = 1.5;
beta = 0.9;

% Define a function
% x = c1, f_x = c2
syms x
f_x_indiff = exp((u_star - log(x))/beta);

% Formula for optimal choice that minimize expenditure
```

```
c2_star_exp_min = exp((u_star + log(beta*(1+r)))/(1+beta));
c1_star_exp_min = (1/(beta*(1+r)))*c2_star_exp_min;
f_optimal_cost = c1_star_exp_min*(1+r)+c2_star_exp_min;

% budget equation
% x = c1, f_x = y
f_x_budget = (e1*(1+r) + e2) + (-1)*(1+r)*x;
f_x_budget_optimal_cost = f_optimal_cost + (-1)*(1+r)*x;

% Set bounds on the domain
fl_x_lower = 0;
fl_x_higher = 6;

% Graph
hold on;
fplot(f_x_indiff, [fl_x_lower, fl_x_higher])
fplot(f_x_budget, [fl_x_lower, fl_x_higher])
fplot(f_x_budget_optimal_cost, [fl_x_lower, fl_x_higher])

% plot a one point scatter plot
scatter(c1_star_exp_min, c2_star_exp_min, 300, 'filled');

% Add x-axis and y-axis
xline(0);
yline(0);

% Title and y and y-able
title(['Plot function: ' char(f_x_indiff)],'Interpreter',"none");
ylabel('c2');
xlabel('c1');

% this sets x and y visual boundaries
ylim([0,6]);
xlim([0,6]);
% Add grids
grid on;
grid minor;
```


Plot function: exp(5/3 - (10*log(x))/9)
c2
c1
0
1
2
3
4
5
6
0
1
2
3
4
5
6