CompEcon - Problem Set 1

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1 Exercise 3

1.1

Matlab Code for Bisection Algorithm

```
% Bisection Method
clear
clc
%% Tolerance
tol = 1.e-10;
% Function
myFunction = @(x) x.^3 + 4 - 1/x;
% Initial Values
x_lower = -100;
x_upper = 100;

x_mid = (x_lower + x_upper)/2;

while abs(myFunction(x_mid))>tol
    if (myFunction(x_mid)*myFunction(x_lower)) < 0
        x_upper = x_mid;
    else
        x_lower = x_mid;
    end
    x_mid = (x_lower + x_upper)/2;
end
fprintf ('The root is %g\n', x_mid)
```

1.2

We use the bisection method to compute the zeroes of the following functions:
(a)

$$f(x) = x^3 + 4 - 1/x$$

has a root $x = 0.249038$

(b)
$$f(x) = -exp(-x) + exp(-x^2)$$
has a root $x = 0$ and a root at 51, obtained varying the starting points.

1.3

$$b * q + d * q^{\phi} - (a - c) = 0$$
Assume
$$a = 3, b = 0.5, c = d = 1, \psi = 0.5$$
We then have
$$\frac{q}{2} + \sqrt{q} - 2 = 0$$
analytical solution:
$$\frac{q}{2} + \sqrt{q} - 2 = 0$$
bisection method: 1.52786
with matlab built-in function *fzero*: 1.527864045000420

2 Exercise 4

We load the data with import data as a table, excluding raws with unimportable cells. After cheching with isnan, we have 104 countries in our dataset.
Matlab Code for A Contribution to the Empirics of Economic Growth

```
Nonoil = MRW92QJEdata(MRW92QJEdata.Nonoil==1,:);
intermediate = MRW92QJEdata(MRW92QJEdata.intermediate
   ==1,:);
OECD = MRW92QJEdata(MRW92QJEdata.oecd==1,:);

%Nonoil Subsample
gdp1985 = Nonoil.gdpadult1985;
gdp1960 = Nonoil.gdpadult1960;
log_gdp1985 = log(gdp1985);
log_gdp1960 = log(gdp1960);
Iy = Nonoil.Iy;
log_Iy = log(Iy);
popgr = Nonoil.growthworkingagepop;
log_growth = log(popgr + 0.5);
school = Nonoil.school;
log_school = log(school);
```

```
y = log_gdp1985 - log_gdp1960;
X = [ones(size(log_gdp1960)) log_gdp1960 log_Iy
   log_growth log_school];
[a] = regress(y,X)

%intermediate Subsample
gdp1985 = intermediate.gdpadult1985;
gdp1960 = intermediate.gdpadult1960;
log_gdp1985 = log(gdp1985);
log_gdp1960 = log(gdp1960);
Iy = intermediate.Iy;
log_Iy = log(Iy);
popgr = intermediate.growthworkingagepop;
log_growth = log(popgr + 0.5);
school = intermediate.school;
log_school = log(school);
y = log_gdp1985 - log_gdp1960;
X = [ones(size(log_gdp1960)) log_gdp1960 log_Iy
   log_growth log_school];
[b] = regress(y,X)



%OECD Subsample
gdp1985 = OECD.gdpadult1985;
gdp1960 = OECD.gdpadult1960;
log_gdp1985 = log(gdp1985);
log_gdp1960 = log(gdp1960);
Iy = OECD.Iy;
log_Iy = log(Iy);
popgr = OECD.growthworkingagepop;
log_growth = log(popgr + 0.5);
school = OECD.school;
log_school = log(school);
y = log_gdp1985 - log_gdp1960;
X = [ones(size(log_gdp1960)) log_gdp1960 log_Iy
   log_growth log_school];
[c] = regress(y,X)


P = [a b c]
```