Econ 512 HW 2

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September 2018

1 Question 1: Result

```
DA =

    0.4223

>> DB

DB =

    0.4223

>> D0

D0 =

    0.1554
```

2 Question 2: Result

Here, 'p˙initial' is the initial guess of the price vector and 'p' is the Broyden Solution.

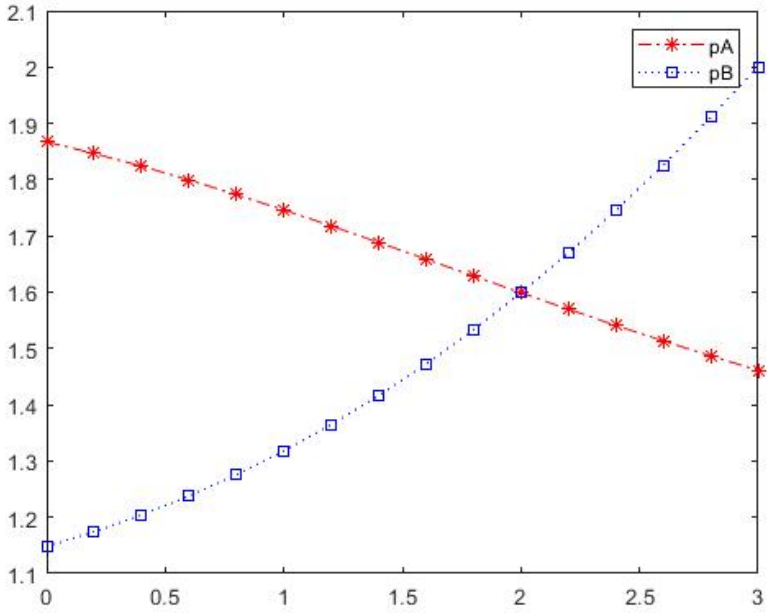
```
p_initial =
    1
    1

>> p

p =

   1.5989
   1.5989
```

3 Question 5: Result



4 Question 4: Result

```
p1 =

    1.5989


p2 =

    1.5989
```

5 Question 1: Codes

```
function [DA,DB,D0] = demand(vA,vB,pA,pB);
DA = exp(vA - pA)/(1 + exp(vA - pA)+ exp(vB - pB));
DB = exp(vB - pB)/(1 + exp(vA - pA)+ exp(vB - pB));
D0 = 1/(1 + exp(vA - pA)+ exp(vB - pB));
end

[DA DB D0] = demand(2,2,1,1);
```

6 Question 2: Codes

```
function [FOCs] = foc(vA,vB,p);
DA = exp(vA - p1)/(1 + exp(vA - p1)+ exp(vB - p2));
DB = exp(vB - p2)/(1 + exp(vA - p1)+ exp(vB - p2));
FOCs = [DA*(1-p(1)) + p(1)*DAˆ2; DB*(1-p(2)) + p(2)*DBˆ2]
end

handle = @(p) foc(2,2,p);
p˙initial = [1;1];
p = broyden(handle,p˙initial);
```

7 Question 5: Codes

```
clear
vA = 2;
vB = [0:.2:3]';
n = size(vB,1);
final = ones(2,n);
for i = 1:n
handle = @(p) foc(vA,vB(i),p)
p˙init = [1;1]
p = broyden(handle,p˙init)
final(:,i) = p
end

pA = final(1,:);
pB = final(2,:);
plot (vB,pA,'-.r*');
hold on
plot(vB,pB,':bs')
legend('pA','pB')
```

8 Question 4: Codes

```
function [FOC˙A,FOC˙B] = trial(vA,vB,p1,p2)
DA = exp(vA - p1)/(1 + exp(vA - p1)+ exp(vB - p2));
DB = exp(vB - p2)/(1 + exp(vA - p1)+ exp(vB - p2));
FOC˙A = DA*(1-p1) + p1*DAˆ2;
FOC˙B = DB*(1-p2) + p2*DBˆ2
end

p1 = 1;
p2 = 2;
err = inf;
tol = 1e-10;
while abs(err) > 1e-10
[FOC_A, FOC_B] = trial(2,2,p1,p2)
err = max(FOC˙A,FOC˙B)
[DA, DB] = demand(2,2,p1,p2)
p1 = inv(1- DA)
p2 = inv(1 -DB)
end
```

(Please note that I referred to the web for help with a few commands in this document.)