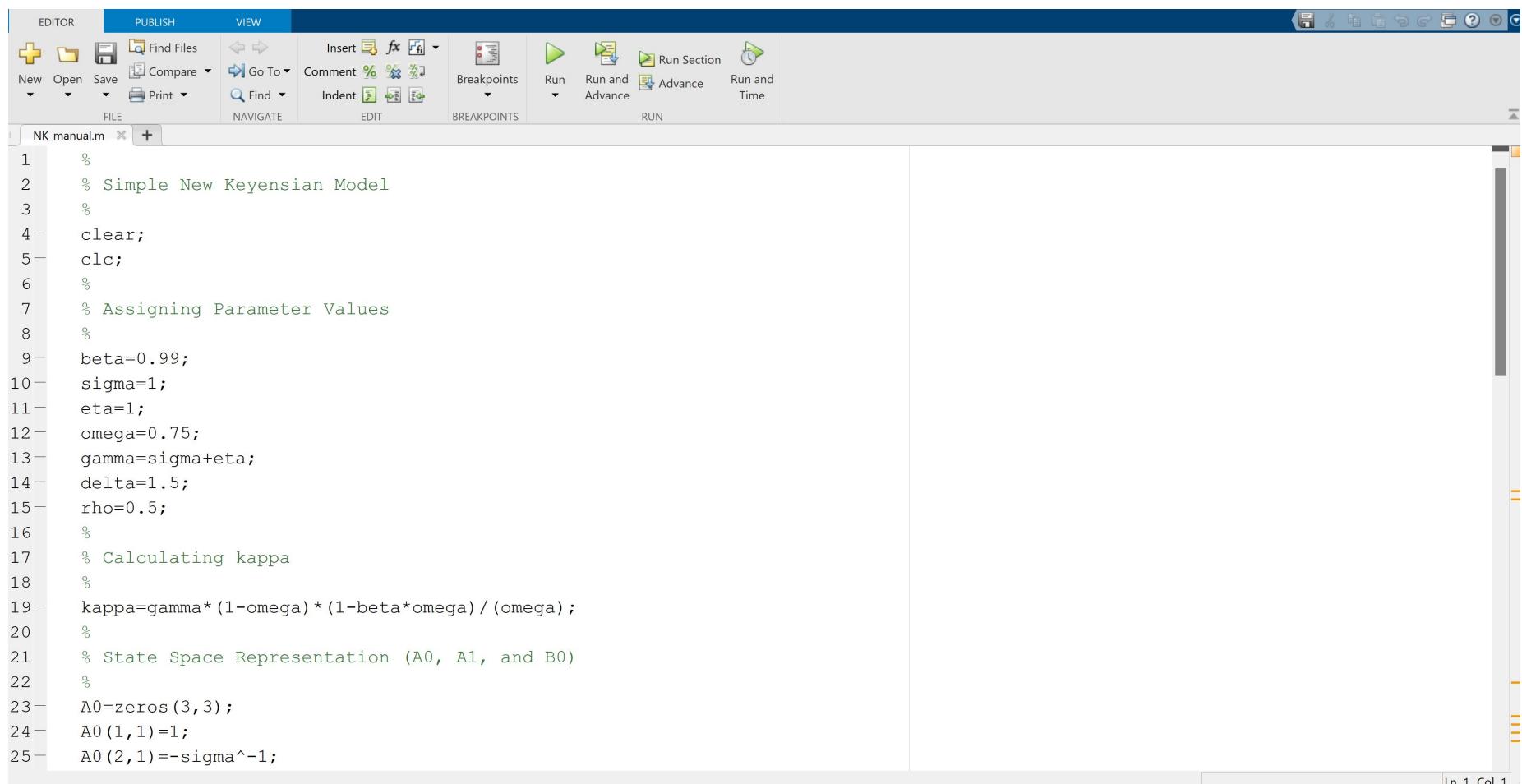


Matlab



The screenshot shows the Matlab IDE interface with the following details:

- Toolbar:** Includes buttons for FILE (New, Open, Save, Print), NAVIGATE (Find Files, Go To, Find), EDIT (Comment, Indent, Breakpoints), and RUN (Run, Run and Advance, Run Section, Run and Time).
- Editor Area:** Displays the code file `NK_manual.m`. The code initializes parameters for a New Keynesian Model and sets up a state space representation.
- Code Content:**

```
1 %  
2 % Simple New Keynesian Model  
3 %  
4 clear;  
5 clc;  
6 %  
7 % Assigning Parameter Values  
8 %  
9 beta=0.99;  
10 sigma=1;  
11 eta=1;  
12 omega=0.75;  
13 gamma=sigma+eta;  
14 delta=1.5;  
15 rho=0.5;  
16 %  
17 % Calculating kappa  
18 %  
19 kappa=gamma*(1-omega)*(1-beta*omega)/(omega);  
20 %  
21 % State Space Representation (A0, A1, and B0)  
22 %  
23 A0=zeros(3,3);  
24 A0(1,1)=1;  
25 A0(2,1)=-sigma^-1;
```

The screenshot shows a MATLAB IDE interface with a menu bar at the top. The menu bar includes 'EDITOR', 'PUBLISH', and 'VIEW' tabs. Below the menu bar is a toolbar with various icons for file operations like New, Open, Save, Print, and navigation, along with tools for Insert, Comment, Breakpoints, Run, and Run Section.

The main workspace displays a script file named 'NK_manual.m'. The code in the file is as follows:

```
19-    kappa=gamma*(1-omega)*(1-beta*omega)/(omega);
20-
21-    % State Space Representation (A0, A1, and B0)
22-
23-    A0=zeros(3,3);
24-    A0(1,1)=1;
25-    A0(2,1)=-sigma^-1;
26-    A0(2,2)=1;
27-    A0(2,3)=sigma^-1;
28-    A0(3,3)=beta;
29-    A1=zeros(3,3);
30-    A1(1,1)=rho;
31-    A1(2,2)=1;
32-    A1(2,3)=sigma^-1*delta;
33-    A1(3,2)=-kappa;
34-    A1(3,3)=1;
35-    B0=zeros(3,1);
36-    B0(1,1)=1;
37-
38-    % Matrices A and B
39-
40-    A=inv(A0)*A1;
41-    B=inv(A0)*B0;
42-
43-    % Jordan Decomposition
```

The status bar at the bottom right indicates 'Ln 1 Col 1'.

The screenshot shows a MATLAB IDE interface with a menu bar (EDITOR, PUBLISH, VIEW) and toolbars (FILE, NAVIGATE, EDIT, BREAKPOINTS, RUN). A script file 'NK_manual.m' is open in the editor. The code performs Jordan Decomposition of matrix A, sorts eigenvalues and eigenvectors, partitions the matrix into Lambda1, Lambda2, P11, P12, P21, P22, and R, and calculates solutions yw.

```
43 % Jordan Decomposition
44 %
45 [p,lambda] = eig(A);
46 %
47 % Sort Eigenvalues and Eigenvectors
48 %
49 val=diag(lambda);
50 t=sortrows([val p'],1);
51 lambda=diag(t(:,1));
52 p=t(:,2:4)';
53 pstar=inv(p);
54 %
55 % Partition Matrices
56 %
57 LAMBDA1=lambda(1,1);
58 LAMBDA2=lambda(2:3,2:3);
59 P11=pstar(1,1);
60 P12=pstar(1,2:3);
61 P21=pstar(2:3,1);
62 P22=pstar(2:3,2:3);
63 R=pstar*B;
64 %
65 % Solutions
66 %
67 yw=real(-inv(P22)*P21)
```

The screenshot shows the MATLAB IDE interface with the following details:

- Toolbar:** Includes buttons for New, Open, Save, Find Files, Compare, Print, Insert, Comment, Breakpoints, Run, Run and Advance, Run Section, and Run and Time.
- Menu Bar:** Shows EDITOR, PUBLISH, and VIEW.
- File List:** Shows the current file is NK_manual.m.
- Code Editor:** Displays the following MATLAB script:

```
47 % Sort Eigenvalues and Eigenvectors
48 %
49 val=diag(lambda);
50 t=sortrows([val p'],1);
51 lambda=diag(t(:,1));
52 p=t(:,2:4)';
53 pstar=inv(p);
54 %
55 % Partition Matrices
56 %
57 LAMBDA1=lambda(1,1);
58 LAMBDA2=lambda(2:3,2:3);
59 P11=pstar(1,1);
60 P12=pstar(1,2:3);
61 P21=pstar(2:3,1);
62 P22=pstar(2:3,2:3);
63 R=pstar*B;
64 %
65 % Solutions
66 %
67 yw=real(-inv(P22)*P21)
68 ye=real(-inv(P22)*inv(LAMBDA2)*R(2:3,1))
69 ww=real(inv(P11-P12*inv(P22)*P21)*LAMBDA1*(P11-P12*inv(P22)*P21))
70 we=real(inv(P11-P12*inv(P22)*P21)*(R(1:1)-LAMBDA1*P12*inv(P22)*inv(LAMBDA2)*R(2:3,1)))
71
```

The code performs the following steps:

- Sorts eigenvalues and eigenvectors.
- Creates partition matrices P11, P12, P21, and P22.
- Computes solutions yw, ye, ww, and we using various matrix operations involving inv() and *.

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Current Folder

- Name-
- bayesian
- hansen
- Julia
- NK
- R
- BM.m
- BM.mod
- BM2.m
- BM2.mod
- BM2directvalue.mod
- BM2value.mod
- BMdirectvalue.mod
- BMvalue.m
- BMvalue.mod
- filtering.m
- filtering.zip
- firstrandsecondapprox.zip
- hansen.log
- hansen.m
- hansen.mod
- hansen_dynamic.m
- hansen_IRF_e.eps
- hansen_results.mat
- hansen_set_auxiliary_variables.i
- hansen_static.m
- hpfilter.m
- IRFNK.m
- IRFNK.m~
- NK.log

NK_manual.m (Script)

Command Window

```

Yw =
-0.5953
-0.2024

ye =
-1.1906
-0.4047

ww =
0.5000

we =
1

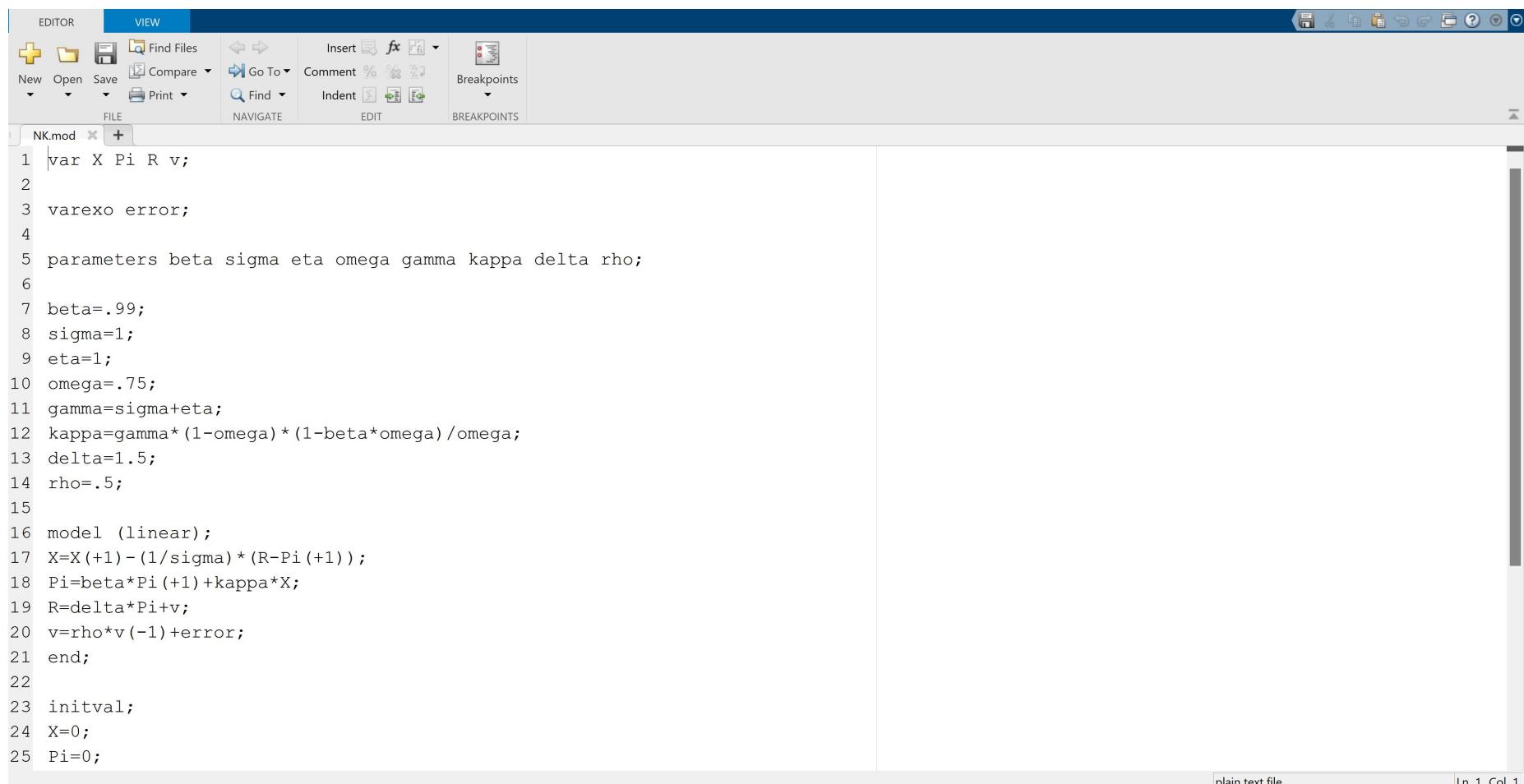
fx >>

```

Workspace

Name	Value
A	[0.5000,0,0]
A0	[1,0,0;-1,1,0]
A1	[0.5000,0,0]
B	[1,1;0]
B0	[1,0,0]
beta	0.9900
delta	1.5000
eta	1
gamma	2
kappa	0.1717
lambda	[0.5000 + 0]
LAMBDA1	0.5000
LAMBDA2	[1.0918 - 0.7500i]
omega	0.7500
p	[0.8466 + 0]
P11	1.1812
P12	[0,0]
P21	[0.3463 + 0]
P22	[0.5818 + 0]
pstar	[1.1812 + 0]
R	[1.1812 + 0]
rho	0.5000
sigma	1
t	3x4 comple
val	[1.0918 + 0]
we	1
ww	0.5000
ye	[-1.1906;-0.4047]
yw	[-0.5953;-0.2024]

Dynare



The screenshot shows the Dynare software interface. The window title is "Dynare". The menu bar includes "EDITOR" and "VIEW". The toolbar contains icons for New, Open, Save, Find Files, Go To, Comment, Insert, Breakpoints, and various navigation and search functions. The main editor area displays a model file named "NK.mod". The code in the file is as follows:

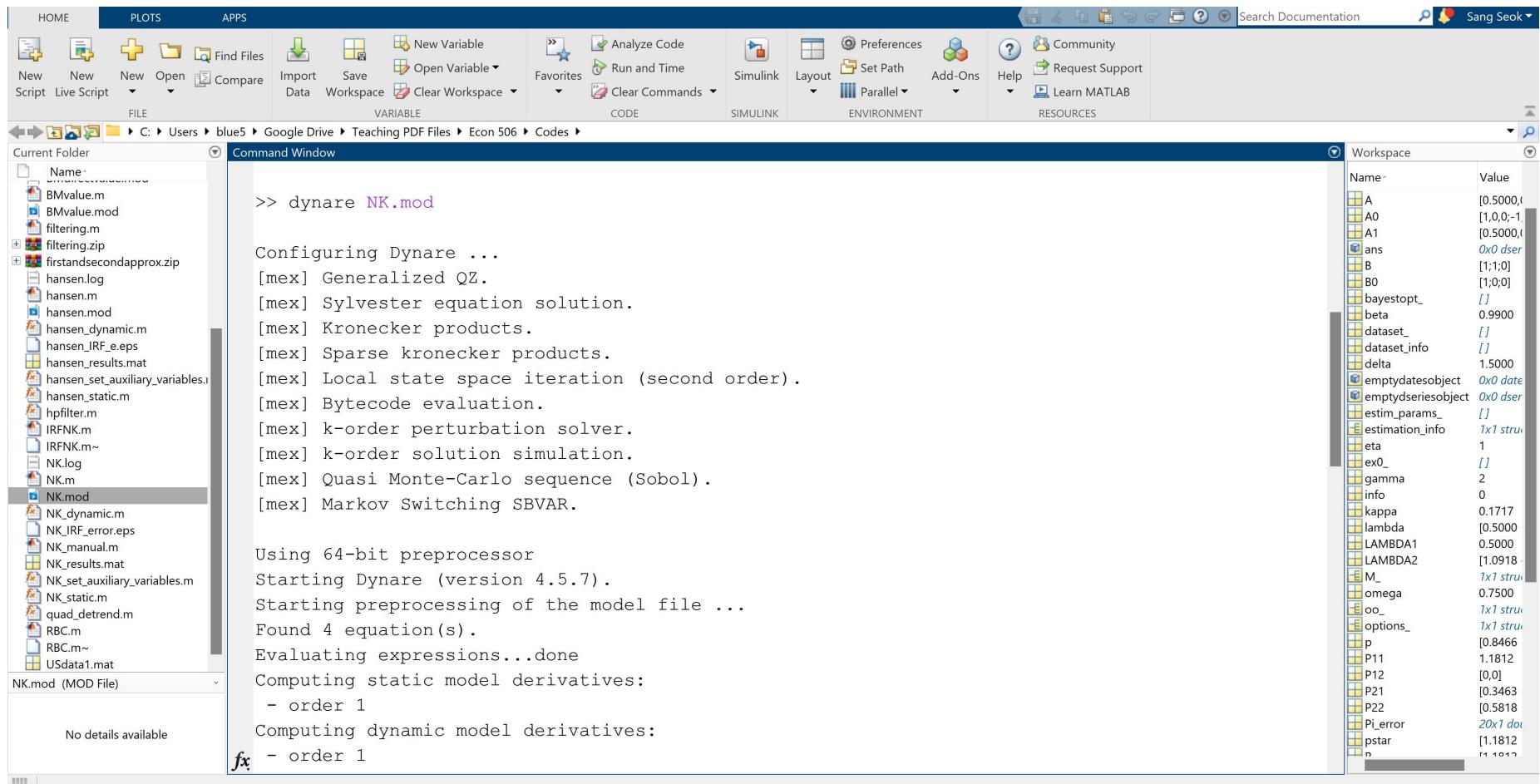
```
1 var X Pi R v;
2
3 varexo error;
4
5 parameters beta sigma eta omega gamma kappa delta rho;
6
7 beta=.99;
8 sigma=1;
9 eta=1;
10 omega=.75;
11 gamma=sigma+eta;
12 kappa=gamma*(1-omega)*(1-beta*omega)/omega;
13 delta=1.5;
14 rho=.5;
15
16 model (linear);
17 X=X(+1)-(1/sigma)*(R-Pi(+1));
18 Pi=beta*Pi(+1)+kappa*X;
19 R=delta*Pi+v;
20 v=rho*v(-1)+error;
21 end;
22
23 initval;
24 X=0;
25 Pi=0;
```

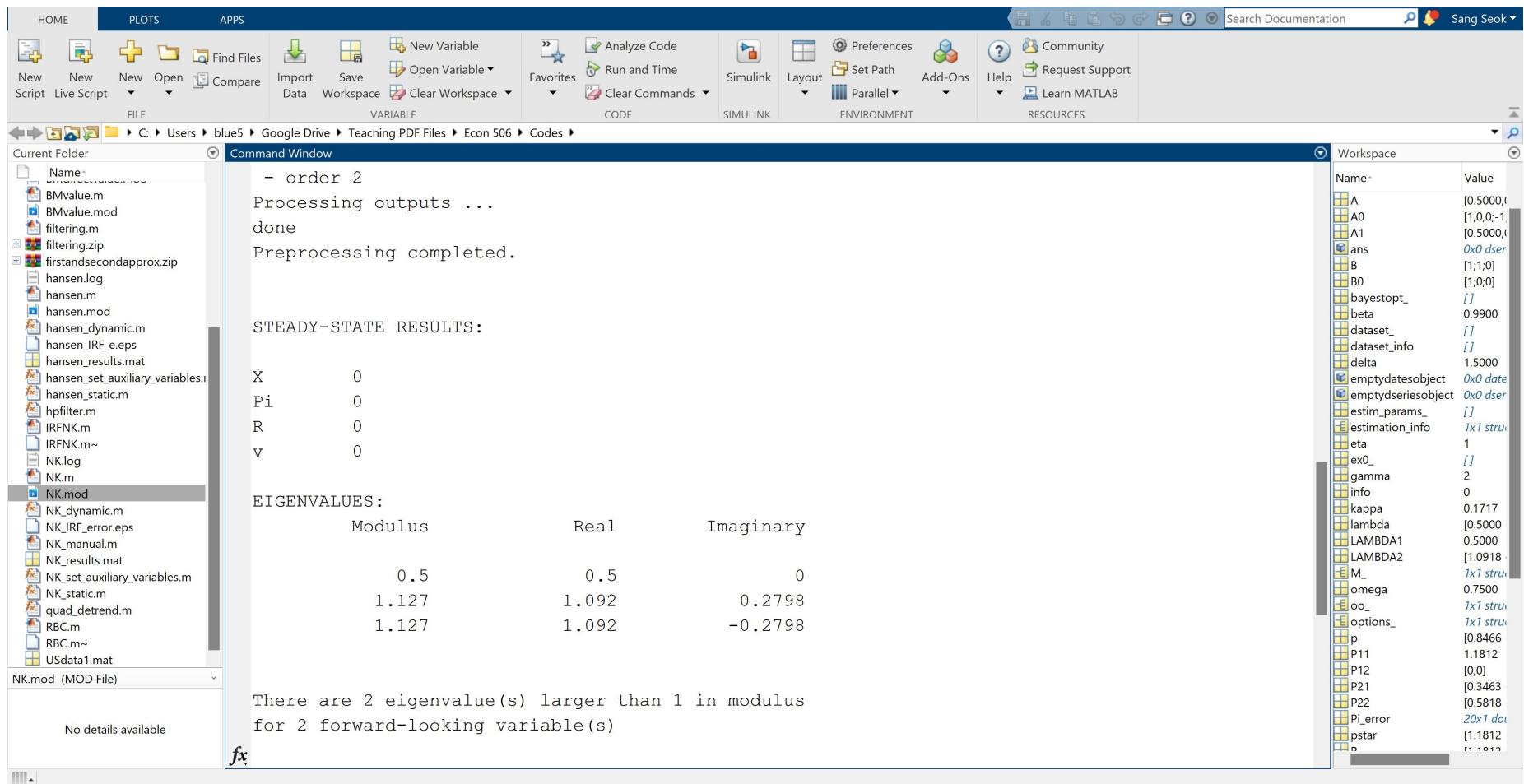
The status bar at the bottom right indicates "plain text file" and "Ln 1 Col 1".

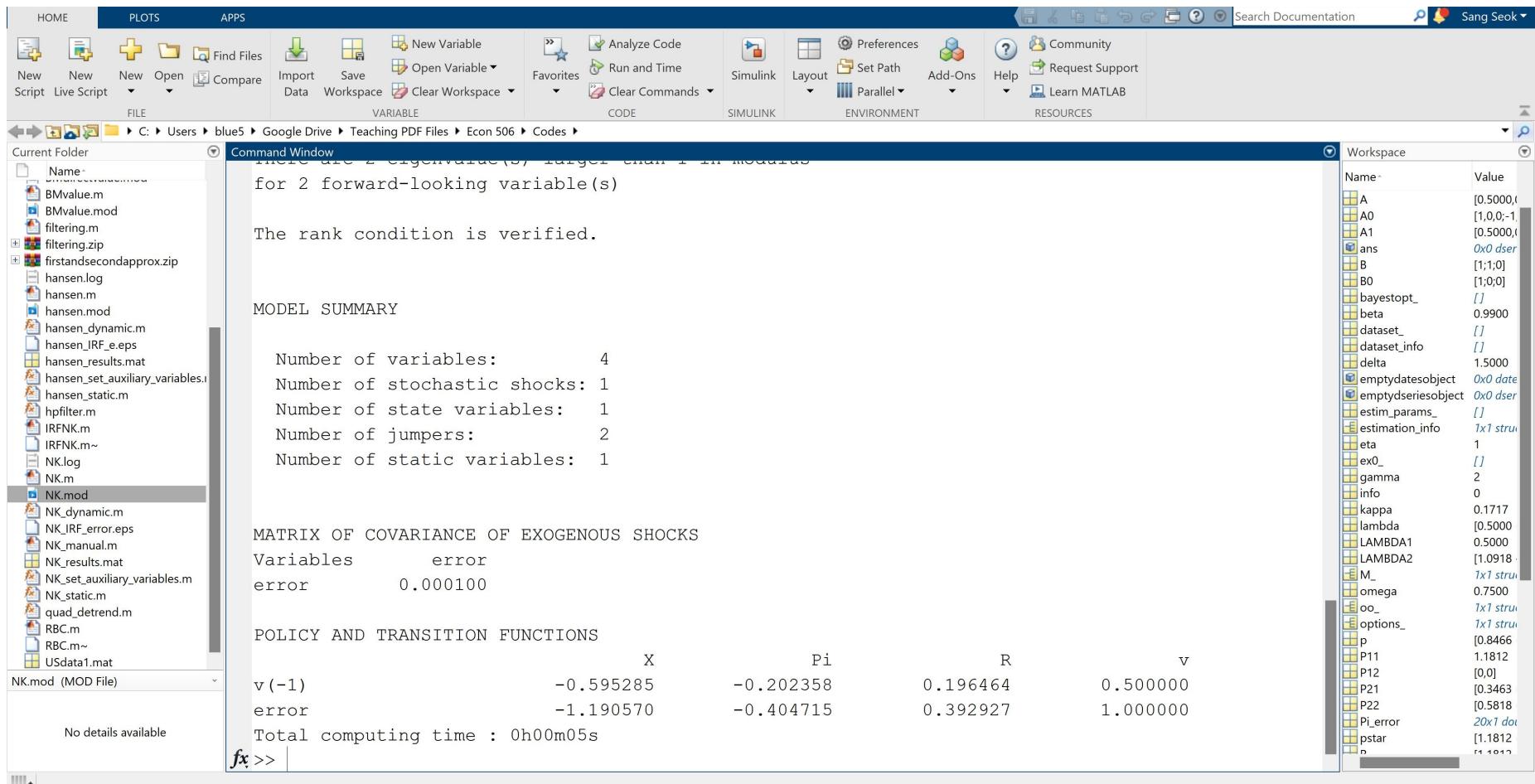
The screenshot shows a software interface with a menu bar at the top. The 'EDITOR' tab is selected. Below the menu are several toolbars: FILE (New, Open, Save, Print), NAVIGATE (Find Files, Compare, Go To, Find, Comment, Indent), EDIT (Insert, Comment, Breakpoints), and BREAKPOINTS. The main window displays a file named 'NK.mod' containing the following code:

```
13 delta=1.5;
14 rho=.5;
15
16 model (linear);
17 X=X(+1)-(1/sigma)*(R-Pi(+1));
18 Pi=beta*Pi(+1)+kappa*X;
19 R=delta*Pi+v;
20 v=rho*v(-1)+error;
21 end;
22
23 initval;
24 X=0;
25 Pi=0;
26 R=0;
27 v=0;
28 end;
29
30 shocks;
31 var error; stderr .01;
32 end;
33
34 steady;
35 check;
36
37 stoch_simul(order=1,nocorr,nomoments,irf=20);
```

At the bottom right of the editor window, there are status indicators: 'plain text file', 'Ln 1 Col 1', and a vertical scroll bar.







R

The screenshot shows the RStudio IDE interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with various icons for file operations like Open, Save, and Print. A search bar labeled "Go to file/function" is followed by a dropdown for "Addins". The main workspace contains an R script titled "nk.R" with the following code:

```
1 # New Keynesian model
2
3 # Assign parameter values
4 beta <- 0.99
5 sigma <- 1
6 eta <- 1
7 omega <- 0.75
8 gamma <- sigma + eta
9 delta <- 1.5
10 rho <- 0.5
11 kappa <- gamma*(1-omega)*(1-beta*omega) / (omega)
12
13 # State space representation (A0, A1, and B0)
14 A0 <- matrix(0, nrow = 3, ncol = 3)
15 A0[1,1] <- 1
16 A0[2,1] <- -sigma^-1
17 A0[2,2] <- 1
18 A0[2,3] <- sigma^-1
19 A0[3,3] <- beta
20 A1 <- matrix(0, nrow = 3, ncol = 3)
21 A1[1,1] <- rho
22 A1[2,2] <- 1
23 A1[2,3] <- sigma^-1*delta
24 A1[3,2] <- -kappa
25 A1[3,3] <- 1
26 B0 <- matrix(0, nrow = 3, ncol = 1)
27 B0[1,1] <- 1
57:32 (Top Level) ♦
```

The right side of the interface features the "Environment" pane, which displays the message "Environment is empty". The "Files", "Plots", and "Package" tabs are also visible in the pane area.

The screenshot shows the RStudio IDE interface. The left pane displays an R script file named "nk.R" with the following code:

```
23 A1[2, 3] <- sigma^-1*delta
24 A1[3, 2] <- -kappa
25 A1[3, 3] <- 1
26 B0 <- matrix(0, nrow = 3, ncol = 1)
27 B0[1, 1] <- 1
28
29 # Matrices A and B
30 A <- solve(A0) %*% A1
31 B <- solve(A0) %*% B0|
32
33 # Jordan decomposition
34 ev <- eigen(A)
35 p <- ev$vectors
36 lambda <- ev$values
37
38 # Sort Eigenvalues and Eigenvectors
39 val <- matrix(lambda, nrow = 3, ncol = 1)
40 lambdaind <- sort(val, index.return = TRUE)$ix
41 augmat <- cbind(val, t(p))
42 augmat <- augmat[lambdaind, ]
43 lambda <- diag(augmat[, 1])
44 p <- t(augmat[, 2:4])
45 pstar <- solve(p)
46
47 # Partition matrices
48 LAMBDA1 <- lambda[1, 1]
49 LAMBDA2 <- lambda[2:3, 2:3]
```

The right pane shows the "Environment" tab, which displays the message "Environment is empty".

The screenshot shows the RStudio interface with the following components:

- Top Bar:** File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, Help.
- Toolbar:** Includes icons for New, Open, Save, Run, Source, and Addins.
- Project:** Project (None).
- Code Editor:** The file `nk.R` contains R code for eigenvalue and eigenvector calculations, matrix partitioning, and solution vectors. The code includes comments and uses the `Re` function for real parts of complex numbers.
- Environment:** Shows the Global Environment pane which is currently empty.
- Plots:** Shows the Plot pane.
- Package:** Shows the Package pane.
- Console:** Shows the console output area.

```
36 lambda <- ev$values
37
38 # Sort Eigenvalues and Eigenvectors
39 val <- matrix(lambda, nrow = 3, ncol = 1)
40 lambdaInd <- sort(val, index.return = TRUE)$ix
41 augmat <- cbind(val, t(p))
42 augmat <- augmat[lambdaInd, ]
43 lambda <- diag(augmat[, 1])
44 p <- t(augmat[, 2:4])
45 pstar <- solve(p)
46
47 # Partition matrices
48 LAMBDA1 <- lambda[1,1]
49 LAMBDA2 <- lambda[2:3,2:3]
50 P11 <- pstar[1,1]
51 P12 <- pstar[1,2:3]
52 P21 <- pstar[2:3,1]
53 P22 <- pstar[2:3,2:3]
54 R <- pstar %*% B
55
56 # Solutions
57 (yw <- Re(-solve(P22) %*% P21))
58 (ye <- Re(-solve(P22) %*% solve(LAMBDA2) %*% R[2:3,1]))
59 (ww <- Re(solve(P11 - P12 %*% solve(P22) %*% P21) %*% LAMBDA1 %*% (P11 - P12 %*% solve(P22) %*% P21)))
60 (we <- Re(solve(P11 - P12 %*% solve(P22) %*% P21) %*%
61           (R[1:1] - LAMBDA1 %*% P12 %*% solve(P22) %*% solve(LAMBDA2) %*% R[2:3,1])))
```

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

nk.R x

Source on Save | Run | Source | Environment | History | Data | Files | Plots | Package

Environment

History

177 MiB

Data

A num [1:...]

A0 num [1:...]

A1 num [1:...]

aug... cplx [1:...]

Files

Plots

Package

R Script

Console Terminal Jobs

R 4.1.1 · ~/

```
>
> # Solutions
> (yw <- Re(-solve(P22) %*% P21))
[1,] -0.5952849
[2,] -0.2023576
> (ye <- Re(-solve(P22) %*% solve(LAMBDA2) %*% R[2:3,1]))
[1,] -1.1905697
[2,] -0.4047151
> (ww <- Re(solve(P11 - P12 %*% solve(P22) %*% P21) %*% LAMBDA1 %*% (P11 - P12 %*% solve(P22) %*% P21)))
[1,] 0.5
> (we <- Re(solve(P11 - P12 %*% solve(P22) %*% P21) %*%
+ (R[1:1] - LAMBDA1 %*% P12 %*% solve(P22) %*% solve(LAMBDA2) %*% R[2:3,1])))
[1,] 1
> |
```

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3.0.11 6.3.0 0.0.1

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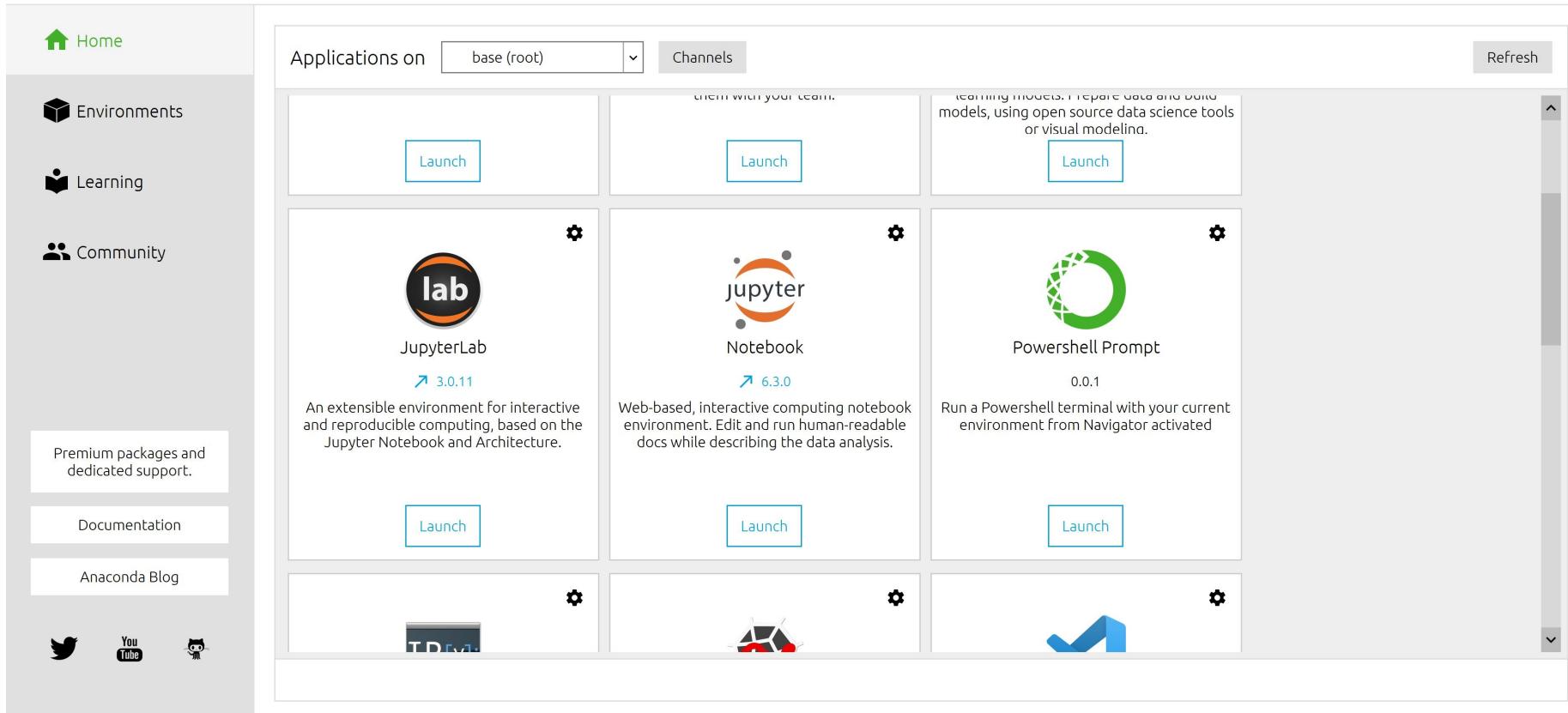
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4.2.5

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1.63.2

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[Launch](#)

The screenshot shows a Jupyter Notebook interface with a dark theme. On the left is a file browser sidebar with a search bar and a list of files in the directory `/Julia_files/`. The main area contains a code editor with numbered code cells. The kernel version is listed as `Julia 1.7.0 | Idle`. The status bar at the bottom shows "Saving completed" and "Mode: Command".

```
[1]: using LinearAlgebra # Load necessary package
[2]: beta = 0.99; sigma = 1.0; eta = 1.0; omega = 0.75; gamma = sigma + eta; delta = 1.5; rho = 0.5; # declare parameter values
[3]: kappa = gamma * (1-omega) * (1-beta * omega) / omega; # calculate kappa
[4]: A0 = zeros(3,3); # state space matrix A0
A0[1,1] = 1;
A0[2,1] = -sigma^-1;
A0[2,2] = 1;
A0[2,3] = sigma^-1;
A0[3,3] = beta;
[5]: A1 = zeros(3,3); # state space matrix A1
A1[1,1] = rho;
A1[2,2] = 1;
A1[2,3] = sigma^-1 * delta;
A1[3,2] = -kappa;
A1[3,3] = 1;
[6]: B0 = zeros(3,1); # state space matrix B0
B0[1,1] = 1;
[7]: A = inv(A0) * A1; # matrices A and B
B = inv(A0) * B0;
[8]: lambda, p = eigen(A); # Jordan decomposition
```

The screenshot shows a Jupyter Notebook interface with a dark theme. On the left is a file browser pane titled "nk.ipynb" showing a single file "nk.ipynb" in the directory "/Julia_files/". The main pane displays a sequence of Julia code cells:

```
[8]: lambda, p = eigen(A); # Jordan decomposition
[9]: lambdaind = sortperm(lambda, by = abs); # index of eigenvalues sorted in increasing order
[10]: t = [lambda transpose(p)] # eigenvalues augmented with corresponding eigenvectors, sorted in increasing order of eigenvalues
      t = t[lambdaind, :];
[11]: lambda = diagm(t[:,1]); # reordered eigenvalues and eigenvectors
      p = transpose(t[:,2:end]);
[12]: pstar = inv(p); # inverse of p
[13]: LAMBDA1 = lambda[1,1]; # partitioned matrices
      LAMBDA2 = lambda[2:3,2:3];
      P11 = pstar[1,1];
      P12 = transpose(pstar[1,2:3]);
      P21 = pstar[2:3,1];
      P22 = pstar[2:3,2:3];
      R = pstar * B;
[14]: yw = real(-inv(P22)*P21)
[14]: 2-element Vector{Float64}:
      -0.5952848722986247
      -0.2023575638506876
[15]: ye = real(-inv(P22) * inv(LAMBDA2) * R[2:3,1])
[15]: 2-element Vector{Float64}:
```

The status bar at the bottom indicates "Simple" mode, "0" notebooks open, "Julia 1.7.0 | Idle", "Saving completed", "Mode: Command", "Ln 1, Col 1", and "nk.ipynb".

The screenshot shows a Julia 1.7.0 notebook interface. On the left, there's a sidebar with a file tree showing a single file named "nk.ipynb" in the "Julia_files/" directory, last modified 3 minutes ago. The main area is a code editor with several code cells:

```
[14]: yw = real(-inv(P22)*P21)
[14]: 2-element Vector{Float64}:
      -0.5952848722986247
      -0.2023575638506876

[15]: ye = real(-inv(P22) * inv(LAMBDA2) * R[2:3,1])
[15]: 2-element Vector{Float64}:
      -1.1905697445972492
      -0.4047151277013751

[16]: ww = real(inv(P11 .. P12*inv(P22)*P21) * LAMBDA1 * (P11 .. P12*inv(P22)*P21))
[16]: 0.5

[17]: we = real(inv(P11 .. P12*inv(P22)*P21) * (R[1:1] .. LAMBDA1*P12*inv(P22)*inv(LAMBDA2)*R[2:3,1]))
[17]: 1-element Vector{Float64}:
      1.0
```

The status bar at the bottom indicates "Saving completed" and "Mode: Command".