```
                                                      ___  ____  ____  ____  ____(R)
                                                     /__    /   ____/   /   ____/
                                                    ___/   /   /___/   /   /___/
                                                      Statistics/Data Analysis

                                                            User: 第三次作业

      ___  ____  ____  ____  ____ (R)
     /__    /   ____/   /   ____/
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Notes:
      1.  Unicode is supported; see help unicode_advice.

 1 . doedit "C:\Users\可乐咖啡1茶\Desktop\444.do"

 2 . doedit "C:\Users\可乐咖啡1茶\Desktop\333.do"

 3 .
 4 . use "C:\Users\可乐咖啡1茶\Documents\百度云同步盘\大三下\课程\计量经济学\第三次上机数据\USA gdp.d
   > ta"

 5 .
 6 . *E14.1

 7 .
 8 . *a.

 9 .
10 . sum growth

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      growth |        220    .0077219    .0092819  -.0274444   .0385857

11 .
12 . *b.

13 .
14 . gen annualrate=400*growth

15 .
16 . sum annualrate

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
  annualrate |        220    3.088771    3.712767  -10.97775   15.43427

17 .
18 . *The mean growth rate is 3.09%

19 .
20 . *c.

21 .
22 . *The standard deviation of ΔYt is 3.71%
```

```
23 .
24 . *d.

25 .
26 . tsset quarterly
        time variable:  quarterly, 1955q1 to 2009q4
                delta:  1 quarter

27 .
28 . corrgram annualrate, lags(4)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.3324   0.3327   24.64  0.0000           ├──                ├──
2        0.2076   0.1101   34.296  0.0000          ├─                 │
3        0.0516  -0.0530   34.894  0.0000          │                  │
4        0.0017  -0.0295   34.895  0.0000          │                  │

29 .
30 . *The first four autocorrelations are 0.3324, 0.2076, 0.0516, 0.0017 respectively.And these autoc
> orrelations have no units at all.

31 .
32 . *E14.2

33 .
34 . *a.

35 .
36 . arima annualrate, arima(1,0,0)

(setting optimization to BHHH)
Iteration 0:   log likelihood = -587.12931
Iteration 1:   log likelihood = -587.10579
Iteration 2:   log likelihood =  -587.1039
Iteration 3:   log likelihood = -587.10377
Iteration 4:   log likelihood = -587.10376

ARIMA regression

Sample:  1955q1 - 2009q4                        Number of obs     =        220
                                                Wald chi2(1)      =      36.83
Log likelihood = -587.1038                      Prob > chi2       =     0.0000

------------------------------------------------------------------------------
             |                 OPG
  annualrate |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
annualrate   |
       _cons |   3.111904   .3578132     8.70   0.000     2.410603    3.813205
-------------+----------------------------------------------------------------
ARMA         |
          ar |
         L1. |   .3389084   .0558426     6.07   0.000     .2294589    .4483578
-------------+----------------------------------------------------------------
       /sigma |   3.488238   .1315256    26.52   0.000     3.230452    3.746023
------------------------------------------------------------------------------
Note: The test of the variance against zero is one sided, and the two-sided
      confidence interval is truncated at zero.

37 .
```

```
38 . *The coefficient is 0.339, which is statistically significantly different from zero. The 95% sig
   > nificance interval is (0.229,0.448).

39 .
40 . *b.

41 .
42 . arima annualrate, arima(2,0,0)

   (setting optimization to BHHH)
   Iteration 0:   log likelihood = -585.77123
   Iteration 1:   log likelihood =  -585.7491
   Iteration 2:   log likelihood = -585.74659
   Iteration 3:   log likelihood = -585.74626
   Iteration 4:   log likelihood = -585.74621
   (switching optimization to BFGS)
   Iteration 5:   log likelihood =  -585.7462

   ARIMA regression

   Sample:  1955q1 - 2009q4                        Number of obs     =        220
                                                   Wald chi2(2)      =      40.31
   Log likelihood = -585.7462                      Prob > chi2       =     0.0000

   ------------------------------------------------------------------------------
                |                 OPG
     annualrate |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
   -------------+----------------------------------------------------------------
   annualrate   |
          _cons |   3.122645   .4088207     7.64   0.000     2.321371    3.923919
   -------------+----------------------------------------------------------------
   ARMA         |
             ar |
            L1. |   .3017241   .0578773     5.21   0.000     .1882867    .4151616
            L2. |   .1117285    .056712     1.97   0.049      .000575    .2228819
   -------------+----------------------------------------------------------------
          /sigma |   3.466578   .1291045    26.85   0.000     3.213538    3.719618
   ------------------------------------------------------------------------------
   Note: The test of the variance against zero is one sided, and the two-sided
         confidence interval is truncated at zero.

43 .
44 . *The coefficient is 0.112, which is statistically significantly different from zero at a 5% conf
   > idence level, but not significant at a %1 level. Yes, this model is preferred to the AR(1) model
   > .

45 .
46 . *c.

47 .
48 . arima annualrate, arima(3,0,0)

   (setting optimization to BHHH)
   Iteration 0:   log likelihood = -585.45381
   Iteration 1:   log likelihood = -585.43695
   Iteration 2:   log likelihood = -585.43522
   Iteration 3:   log likelihood = -585.43496
   Iteration 4:   log likelihood = -585.43491
   (switching optimization to BFGS)
   Iteration 5:   log likelihood = -585.43491

   ARIMA regression

   Sample:  1955q1 - 2009q4                        Number of obs     =        220
                                                   Wald chi2(3)      =      41.85
   Log likelihood = -585.4349                      Prob > chi2       =     0.0000
```

annualrate	Coef.	OPG Std. Err.	z	P>|z|	[95% Conf.	Interval]
annualrate						
_cons	**3.118774**	**.3891566**	**8.01**	**0.000**	**2.356041**	**3.881507**
ARMA						
ar						
L1.	**.3077955**	**.0584658**	**5.26**	**0.000**	**.1932045**	**.4223864**
L2.	**.1274619**	**.0580442**	**2.20**	**0.028**	**.0136974**	**.2412264**
L3.	**-.0536832**	**.0645085**	**-0.83**	**0.405**	**-.1801175**	**.0727511**
/sigma	**3.461562**	**.1320033**	**26.22**	**0.000**	**3.202841**	**3.720284**

Note: The test of the variance against zero is one sided, and the two-sided confidence interval is truncated at zero.

```
49 .
50 . arima annualrate, arima(4,0,0)

(setting optimization to BHHH)
Iteration 0:   log likelihood = -585.35492
Iteration 1:   log likelihood = -585.34003
Iteration 2:   log likelihood = -585.33922
Iteration 3:   log likelihood = -585.33914
Iteration 4:   log likelihood = -585.33912

ARIMA regression

Sample:  1955q1 - 2009q4                        Number of obs     =        220
                                                Wald chi2(4)      =      42.10
Log likelihood = -585.3391                      Prob > chi2       =     0.0000
```

annualrate	Coef.	OPG Std. Err.	z	P>|z|	[95% Conf.	Interval]
annualrate						
_cons	**3.117775**	**.3785102**	**8.24**	**0.000**	**2.375909**	**3.859642**
ARMA						
ar						
L1.	**.30648**	**.0590334**	**5.19**	**0.000**	**.1907767**	**.4221833**
L2.	**.1312015**	**.058193**	**2.25**	**0.024**	**.0171452**	**.2452577**
L3.	**-.0449363**	**.0680058**	**-0.66**	**0.509**	**-.1782252**	**.0883525**
L4.	**-.0300063**	**.0593983**	**-0.51**	**0.613**	**-.1464249**	**.0864122**
/sigma	**3.459933**	**.1331826**	**25.98**	**0.000**	**3.1989**	**3.720966**

Note: The test of the variance against zero is one sided, and the two-sided confidence interval is truncated at zero.

```
51 . *According to BIC, we should choose one lag, but according to AIC we should choose two lags.

52 . *E14.3

53 . arima annualrate, arima(3,0,0)

(setting optimization to BHHH)
Iteration 0:   log likelihood = -585.45381
Iteration 1:   log likelihood = -585.43695
Iteration 2:   log likelihood = -585.43522
Iteration 3:   log likelihood = -585.43496
Iteration 4:   log likelihood = -585.43491
(switching optimization to BFGS)
Iteration 5:   log likelihood = -585.43491

ARIMA regression

Sample:  1955q1 - 2009q4                        Number of obs     =        220
                                                Wald chi2(3)      =      41.85
Log likelihood = -585.4349                      Prob > chi2       =     0.0000
```

annualrate	Coef.	OPG Std. Err.	z	P>|z|	[95% Conf.	Interval]
annualrate						
_cons	**3.118774**	**.3891566**	**8.01**	**0.000**	**2.356041**	**3.881507**
ARMA						
ar						
L1.	**.3077955**	**.0584658**	**5.26**	**0.000**	**.1932045**	**.4223864**
L2.	**.1274619**	**.0580442**	**2.20**	**0.028**	**.0136974**	**.2412264**
L3.	**-.0536832**	**.0645085**	**-0.83**	**0.405**	**-.1801175**	**.0727511**
/sigma	**3.461562**	**.1320033**	**26.22**	**0.000**	**3.202841**	**3.720284**

Note: The test of the variance against zero is one sided, and the two-sided confidence interval is truncated at zero.

```
54 . dfuller annualrate,trend
```

Dickey-Fuller test for unit root Number of obs = **219**

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	**-10.643**	**-4.000**	**-3.434**	**-3.134**

MacKinnon approximate p-value for Z(t) = **0.0000**

```
55 . *The t-statistic is -10.643, which is smaller than 1% critical value. Therefore the null htpothe
> sis that Yt has a unit root is rejected, namely, Yt is stationary around a deterministic trend.

56 .
```