Celeste
Herrera

PSTAT 174 HW #5

may 5, 2021

3 ARMA (3,0) model fit to quarterly time series

$$X_t - 2.637 = .252(X_{t-1} - 2.637) + .061(X_{t-2} - 2.637) - .202(X_{t-3} - 2.637) + Z_t$$

$$2.637 + .252(2.93 - 2.637) + .061(4.62 - 2.637) - .202(2.12 - 2.637)$$

$$\Rightarrow 2.93623$$

2.9363 is known to be smaller than 3 therefore we can conclude Choice A best fits our statement

4 AR(1) mean 0: $\rho(2) = .215$ $\rho(3) = -.100$

$X_T = -.431$

So $\hat{X}_{T+1}$ = value of X_{T+1}

$= \hat{\phi} X_T$

$\hat{\phi}^2 = \rho(2) \Rightarrow \hat{\phi} = \sqrt{.215} = -.463809$

$\hat{X}_{T+1} = (-.463809)(-.431)$

$= .1998465$

5. AR(1) ARMA(1,1) ARMA(1,2) ARMA(2,3) ARMA(4,3)

AIC = $-2 \times \log\text{-likelihood} + 2 \times (p+q+2)$

AR(1) $\overset{AIC}{=} 12 \times (-650) + 2 \times (1+0+2) = 1306$

ARMA(1,1) $\overset{AIC}{=} -2(-641) + 2 \times (1+1+2) = 1209$

ARMA(1,2) $\overset{AIC}{=} -2 \times (-636) + 2(1+2+2) = 1282$

ARMA(2,3) $\overset{AIC}{=} -2 \times (-630) + 2 \times (2+3+2) = 1274$

ARMA(4,3) $\overset{AIC}{=} -2 \times (-629) + 2 \times (4+3+2) = 1276$

ARMA(2,3) has the best known model for time series