

Economics 513: Economic Forecast and Analysis

Department of Economics, Finance and Legal Studies

University of Alabama

Fall 2022

Midterm II

The exam consists of three questions on three pages. Each question is of equal value.

1. Consider the following data generating process

$$Y_t = (-1)^t \varepsilon_t$$

where ε_t is a white noise sequence. For the process Y_t , answer the following:

- (a) Find the h -step ahead forecast for $h = 1, 2, \dots$
- (b) Find the h -step ahead forecast error for $h = 1, 2, \dots$
- (c) Find the h -step ahead interval forecast for $h = 1, 2, \dots$
- (d) Find the h -step ahead density forecast for $h = 1, 2, \dots$
- (e) For a specific realization of Y_t and a specific value of h , plot y_t along with (a), (c) and (d) in a single figure.

2. Draw the flow chart for the Box-Jenkins methodology. Below the chart write one or two sentences to describe each step.

3. Consider the pieces of R output listed below and suppose the last two values for y_t are $y_T = 0.50$ and $y_{T-1} = 1.50$, respectively, where $t = 1, 2, \dots, T$. With this information, answer the following:

```
model.fit = arima(data,order=c(1,0,2),method='ML')
model.fit
Coefficients:
          ar1          ma1          ma2    intercept
          0.0488        0.4705        0.2496       -0.0190
s.e.        0.7467        0.7376        0.3428        1.7343
SSR 405.1: log likelihood = -140.76, aic = 291.53, bic = 300.33
```

```
resid = model.fit$residuals
data = resid
```

```
resid.fit = arima(data,order=c(3,0,0),method='ML')
resid.fit
Coefficients:
          ar1          ar2          ar3    intercept
          0.0345        0.0590        0.0459       -0.0190
s.e.        0.7467        0.7376        0.3428        1.7343
SSR 405.1: log likelihood = -140.76, aic = 291.53, bic = 300.33
```

- Write the equation for the first model?
- Derive the one-step-ahead forecast from the first model.
- What is the h -step ahead forecast for the first model when h tends to infinity?
- Write the equation for the second model?
- What can you conclude from the second model?