STAT 679 - Assignment 3 - Due date is on the course outline

1. 6.2 in the text.

2. 6.6 in the text

3. Add prediction code to that for Example 6.10, so as to duplicate Figure 6.7.

4. Show that the VARMA model with exogenous inputs

$$\mathbf{y}_t = \mathbf{\Gamma}\mathbf{u}_t + \sum_{j=1}^{s} \mathbf{\Phi}_j \mathbf{y}_{t-j} + \mathbf{v}_t + \sum_{l=1}^{s-1} \mathbf{\Theta}_l \mathbf{v}_{t-l}$$

can be represented in state-space form as

$$\mathbf{y}_t = \mathbf{A}\mathbf{z}_t + \mathbf{v}_t, \tag{1}$$
$$\mathbf{z}_{t+1} = \mathbf{\Phi}\mathbf{z}_t + \mathbf{\Upsilon}\mathbf{u}_{t+1} + \mathbf{w}_t, \tag{2}$$

for some choice of $\{\mathbf{z}_t\}$, where

$$\mathbf{\Upsilon} = \begin{pmatrix} \mathbf{\Gamma} \\ \mathbf{0} \\ \vdots \\ \mathbf{0} \end{pmatrix} : ks \times r,$$

and the other terms are as in the development in class.

5. 6.17 (verify Property P6.5)

6. Duplicate Example 6.24. (Include the R-code, and also send it to me electronically.)