ARIMAX Modeling - US Economy

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This exercise is taken from **Time Series Analysis and Its Applications: With R Examples** by Shumway and Stoffer. We will be using the `econ5` data set from the `astsa` library. `econ5` is a five quarterly economic series containing the following numeric variables: quarterly U.S. unemployment, GNP, consumption, government investment, and private investment. There are 161 observtions spanning from 1948-III to 1988-II.

```
library(astsa)
data(econ5)
```

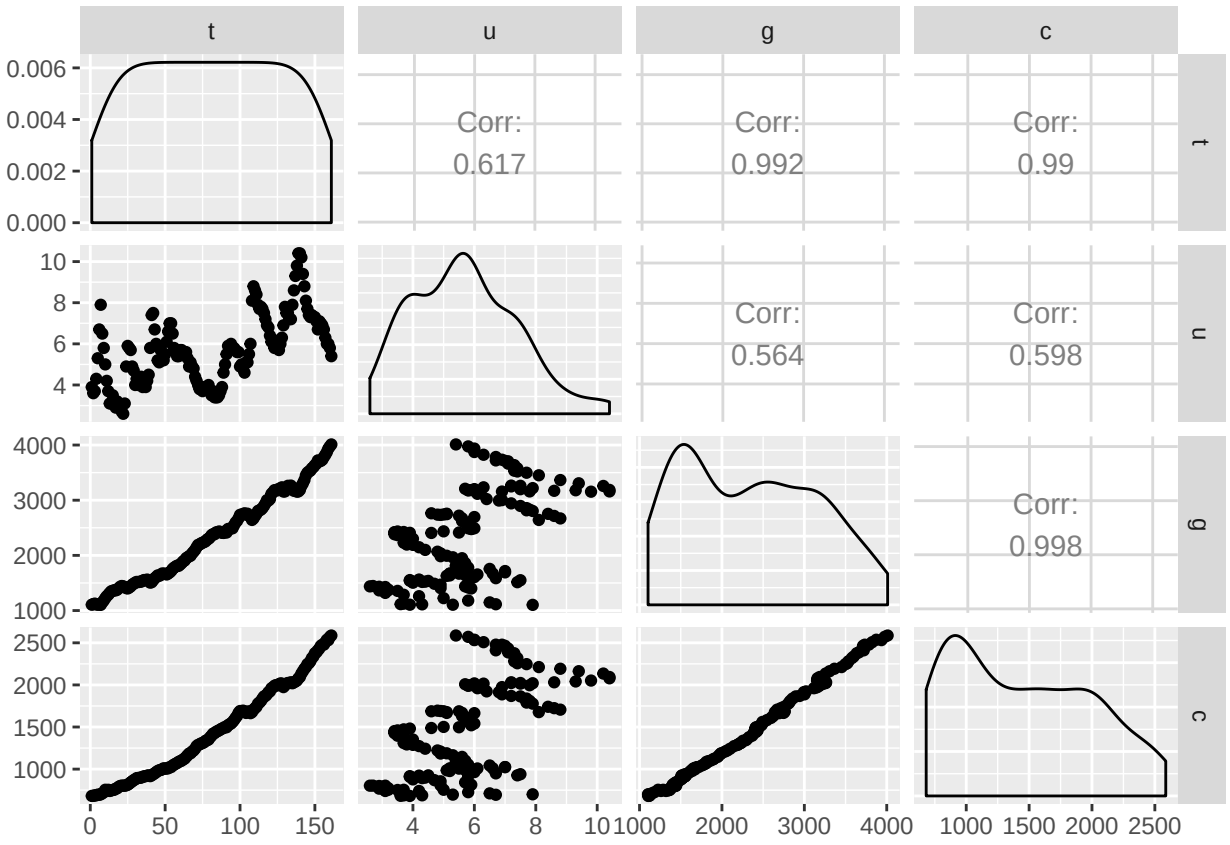
Consider the data set `econ5`. The seasonal component has been removed from the data. Concentrating on unemployment (U_t), GNP (G_t), and consumption (C_t), fit a vector ARMA model to the data after first logging each series, and then removing the linear trend. That is, fit a vector ARMA model to $x_t = (x_{1t}, x_{2t}, x_{3t})^t$ where, for example, $x_{1t} = log(U_t) - \hat{\beta}_0 - \hat{\beta}_1 t$, where $\hat{\beta}_0$ and $\hat{\beta}_1$ are the least squares estimates for the regression of $log(U_t)$ on time t. Run a complete set of diagnostics on the residuals.

Model Fitting

```
#looking at plots just for giggles
t=c(1:161)
u=econ5$unemp
g=econ5$gnp
c=econ5$consum
df=data.frame(t,u,g,c)
library(GGally)
```

```
## Loading required package: ggplot2
```

```
ggpairs(df)
```



Diagnostics