Assignment Answer Draft

Using terminology:

WSS: wide-sense stationary (stationary), 宽平稳（平稳）

**(1).**

, and we know that is WSS (Wide-Sense Stationary). Now we need to find whether is stationary or not. Here is the solution.

By the definition of WSS, we need to find whether and are all constants. Let’s compute the mean first. Since is WSS, we know that , and , which are all constants. Now,

, which are all independent of time .

, which is independent of time t

Therefore is WSS

**(2). (I am not quite sure about the answer…, refer to first PPT, page 29)**

is the target time series. There is a time-dependent seasonal term and a noise term .

Original is not WSS. Since is a seasonal signal and the term is dependent on t, a natural transformation to get the stationary seasonal term is the log transformation .

**(3).**

Since we have the following properties:

, and , we have

We only need to calculate for .

For

Since

Since is a white noise signal, we have , so the above formula can be simplified as,

For ,

So,

For ,

So,

For ,

So,

For ,

So,

Let’s first write it in a AR(1) model form,

For ,

Since and are independent, and , we have,

So,

Since,

We have,

For ,

We have,

Actually, we will have,

So,