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HW 2

1

a) False

In a stationary AR(1) model, the current value $x(t)$ is correlated with its previous value $x(t-1)$ through a parameter, ϕ.

⇒ $AR(1) = x(t) = \phi x(t-1) + \varepsilon(t)$
where $\varepsilon(t)$ is white noise.
While the direct correlation b/w $x(t)$ & $x(t-1)$ for $l \geq 2$ diminishes as l increases, it does not become zero immediately after $l > 1$.
The correlation decreases geometrically with the lag in an AR(1) process & it takes several lags before the correlation is close to zero. especially if $|\phi|$ is close to 1

b) True

In a stationary MA(1) model,

$$x(t) = \varepsilon(t) + \theta\varepsilon(t-1)$$

The autocorrelation function (ACF) for an MA(1) process shows significant correlation at lag 1 due to the direct influence of $\varepsilon(t-1)$ on $x(t)$, but it drops to zero for lags greater than 1 because the moving average terms at different times do not overlap beyond lag 1. Thus, the ACF values cliff after lag 1 making the statement true.