Researcher obtained an ARMA(15,14) as an adequate model for the 500 samples of data, with RSS=1000. However, he/she notices a pair of complex roots close the those indicating seasonality of 12.

(a) What transformation of the data should this researcher do to check for this seasonality?

(b) Once that transformation is done, what model should be forced on the transformed data?

(c) The researcher did exactly that and obtained RSS=1050 on the transformed time-series. Can one say that this researcher confirmed the existence of seasonality 12?

(a) $V_t = (1 - 2\cos\frac{2\pi}{12}B + B^2)X_t =$

$= (1 - \sqrt{3}B + B^2)X_t$

(b) ARMA (13, 14) ← order of the parsimonious model

(c) $$F = \frac{(RSS_{pars} - RSS_{original})/12}{RSS_{original}/(N-r)}$$

↑ # of params in the original model

$N = 500$

$r = 15 + 14 = 29$

(could also be 30, I would accept that)

$$F = \frac{(1050 - 1000)/12}{1000/(500-29)} = 24.275$$

$F_{2,\alpha} = 3,0138$

=> we cannot claim the existence of that seasonality