STA457H1S Final practice questions

1. All exercises at *MTS_R (27 Nov 2017)* course notes.

    1) Important topics include Check stationarity of a vector autoregression, and testing cointegration using Johansen's method.

2. Define Granger causality in terms of a vector autoregression process.

3. Test Granger causality using vector autoregression or univariate approach.

4. State the approaches for cointegration modeling.

5. Granger's representation theorem and its implication for modeling multivariate time series.

6. State time series bootstrapping methods (in particular for dependent time series and dynamic regression models taught in class).

7. Private asset modeling

    In finance literature, appraisal returns y_t on private assets may be model as

    $$y_t = \sum_{i=0}^{m} w_i r_{t-i}, \qquad w_i \geq 0, \sum w_i = 1,$$

    where r_t denotes the (unobservable) economic returns on private assets.

    1) Geltner suggests estimate w_0 using

    $$y_t = (1 - w_0)y_{t-1} + w_0 r_t. \quad (1)$$

    Express w_i in terms of w_0.

    2) Getmansky, Lo, and Markorov suggest estimating $w_i, i = 1, \ldots, m$ by fitting an moving average model of order m. Following their suggestion, we fit the following MA(m) process

    $$y_t = \sum_{i=0}^{m} \theta_i a_{t-i}, \qquad \theta_0 = 1, \theta_i \geq 0. \quad (2)$$

    Express $w_i, i = 0,1,\ldots,m$ and r_t in terms of $\{\theta_i\}_{i=0,1,\ldots,m}$ and $\{a_t\}$ in equation (2).

    3) Suppose that r_t satisfies

    $$r_t = \alpha + \beta f_t + e_t. \quad (3)$$

    Substitute Equation (3) into Equation (1). Express y_t using a distributed lag model with single input f_t.